

COMPUTER WORLD

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Cobol-micro barrier falling

Speedier application development, superior screen-handling facilities cited as advantages

By Paul Karszenowski
CW Staff

When business microcomputers evolved in the late 1970s, corporations drew a dividing line for application development: Microcomputer programs were written in Basic and Ashton-Tate's dBase II; Cobol was reserved for mainframe program development.

A few corporations have crossed this dividing line and have designed Cobol applications for microcomputers. "The application development system we use now is far superior to writing programs with Cobol and IBM's MVS on mainframes," said Jerry Purcell, system manager for Fluor Corp. in Irvine, Calif. "We can develop an application in one-fifth the time it previously required. Our present screen-handling facilities are much better than those with CICS."

Purcell supervises a staff of 10 people

who have worked with Micro Focus, Inc.'s Cobol on IBM Personal Computer XT's and AT's to develop a number of in-house applications, including payroll, labor distribution and construction programs.

These applications are used primarily in stand-alone mode at various Fluor construction sites. Once a week, the payroll information is sent to an IBM 3033 mainframe, and other application data is transmitted monthly.

Most applications are new, made possible by the micro's performance abilities and low cost.

"We consolidate so little data that we use modems rather than direct connections to the mainframe," Purcell noted.

While a few of these applications have replaced mainframe applications, most are new, made possible by the performance capabilities and low cost of microcomputers.

Purcell's group began searching for the best method of utilizing microcomputer

See CWS005, page 9

TOP OF THE NEWS

Not everyone was pleased with M. Bryce & Associates, Inc.'s decision to stop supporting the Pride User Association, Inc., although M. Bryce said it had good reason for doing so. Page 4.

Rising in the microcosm! That is the battle cry at J. C. Penney Co., where a self-paced video program has been adopted to bring 1,400 employees up to speed on a mainframe-based purchasing system. Page 6.

No busman's holiday. The DP manager for New York's Surface Transit Informa-

tion Division computerized bus repair records and used the results to defend a decision to mothball part of the fleet of buses. Page 8.

Massachusetts saved \$50 million in Medicaid payments by switching from manual to computer-generated payment processing. Page 31.

Perkin-Elmer Corp. unveiled an AT&T Unix-based micro said to support five users and to target graphics, computer-aided design and Unix applications. Page 107.

Persistence is her key to success



DP MANAGER PROFILE

By Paul Karszenowski
CW Staff

CLEVELAND — Vivian Wilson, Ingot System Output manager at Ohio Bell Telephone Co., is not afraid to knock on a second door when she is turned away from the first.

In 1967, she was an AT&T central office reporting clerk here, taking steps to enter the data processing field. Wilson had enrolled in a technical school after reading an advertisement on a bus on her way home from work. "The industry was very young and rapidly growing," she said. "I also thought I could make a lot of money."

While she attended data processing classes, AT&T expanded and moved its DP department from downtown Cleveland to a suburb. The department needed additional workers, and Wilson applied for a job in computer operations. "I was told that no blacks were allowed," she said. "I was shocked. It was really the first time in my life that I felt my skin color made me different from other employees."

After she talked to a few of her friends, she reapplied for the position. The results remained the same, but the reason given for her rejection changed. "I was told that there wasn't any room in the new department for me," she stated. "I knew that a few of the people assigned to the new facility did not want to go. They were older women, set in their ways and afraid of working with computers. I was quite

See WILSON page 10

PRODUCT SPOTLIGHT

Do tools help find DP gold?

Users say application generators no cure-all for programming woes

"There comes a time when a programmer wants to spend more time with the user than time coding and reworking the same programs. These [application development] systems shorten the coding process and get the user involved early on."

— Donald Jones, manager of programming and procedures, Arma Research, Inc.

"The users of the products are like the fat guy who is full of enthusiasm and spends a great deal of money on an exercise bike. He starts to use the bike, but he soon finds that it is too hard to lose weight. After six months, the bike is useless and collecting dust. — Just like the productivity tools."

— Vaughan Merly, vice-president and general manager of the systems software division of Walker Interactive Products, Inc.

By John Gellatly
CW Staff

In many ways, the often ineffectual science of application development today is similar to the ancient black art of alchemy. Analysts and programmers, laboring in the recesses of a corporation's computer facilities, must turn the lead of user requirements



into the much-sought-after gold of high-quality, useful application systems for their end-user royalty. And, like their alchemy counterparts, application developers often fail in their quest for gold.

The development of efficient, effective computerized application systems, which have automated many formerly tedious manual tasks, remains a primarily manual, inefficient process. Hand coding programs is still the norm in the majority of development houses, and designing and maintaining applications continues to be a time-consuming and costly undertaking.

Most in-house development organizations share a number of nagging and increasingly worrisome problems — growing backlogs, user dissatisfaction over poorly designed and implemented systems and a staggering maintenance work load. Despite the adoption by many shops of advanced design methodologies and structured programming techniques, the problems show little sign of abating.

See DEVELOP page 17

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NEWSPAPER

NEWS

FCC begins tariff review

Commission to consider local telephone companies' revised proposals for private-line user charges

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — The Federal Communications Commission has begun what could be the final review of special-access charges that will be faced by private-line users in January if the rates submitted by the local telephone companies last week are approved.

Special access is a class of local exchange access service that will be provided by local telephone companies to connect interstate, private-line customers with long-distance carriers and will heavily affect large-volume communications users of private lines.

Earlier this year the FCC twice rejected proposed special-access tariffs filed by the local exchange telephone companies, saying the companies did not apply a "consistent, building block tariff" approach to users whom it wanted to assure the burden and discretion of assembling services that, in the past, were bundled by long-distance carriers.

Last month, the FCC ordered new special-access tariffs to be filed by Dec. 3 to take effect Jan. 17. The latest tariffs will have to meet the FCC's demand that they be reasonable, cost-justified and relatively uniform from one local telephone area to another.

In this regard, the National Exchange Carriers Association (Neca), representing the majority of local exchanges across the country, has complied with the special-access rate restructuring ordered by the FCC to disaggregate two- and four-wire communications channels, as well as voice-grade channels from telegraph-grade channels previously bundled together.

Additionally, the exchange carriers made adjustments in interface channel charges that con-

nect to a private-line link to reflect direct differences in distances.

The Neca tariffs have proposed five rate elements of special access:

■ First, a local channel, defined as a channel between two customer premises or between a customer and a local telephone company hub office where multiplexing is performed.

■ Second, a connecting channel, defined as a channel between a customer and a telephone company hub where bridging or linking to three or more other sites in a multipoint, private-line network is accomplished.

■ Third, channel mileage, reflective of the actual channel mileage for transmission between two customer facilities, a customer and the local telephone hub office or two telephone company offices.

■ Fourth, channel interface, defining the technical characteristics associated with the type of signaling and type of facilities used at each point of termination.

■ Fifth, optional functions and features that a special-access user requires, such as multiplexing, bridging and conditioning.

Additionally, the Neca tariffs have proposed eight different channel types: narrowband, voice grade, program audio, video, wideband analog, wideband digital, digital data and high capacity.

One of the major objections raised by the FCC to the special-access rates was the different charges for essentially similar rate elements: the local channel and the connecting channel.

To avoid the "rate shock" alleged by the competitive long-distance industry, which will also be covered by special access, the FCC has proposed a phase-in of the special-access tariff rates over a one-year period.

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management trends? The trade press is overbooked.

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Reagan sanctions U.S. satellite competition

WASHINGTON, D.C. — Competition in international satellite communications is in the nation's interest, President Ronald Reagan has concluded.

However, under new U.S. policy, private-sector competition to the International Telecommunications Satellite Organization (Intelsat), the global consortium of countries supporting satellite communications, will be limited to providing intra-company voice, data communications and video transmissions.

The private-sector satellite firms will be barred from offering public-switched communications and will be required to consult with Intelsat on their business plans.

A second condition facing private-sector satellites will be foreign administration authorization, which will ensure technical compatibility with Intelsat.

Intelsat has strenuously opposed private-sector competition, particularly in the North Atlantic region, where current service proposals before the Federal Communications Commission are still un-

der consideration.

Reagan's statement of national interest also instructed the U.S. Department of Commerce and the Department of State to formulate new satellite communications policies that are supportive of the Intelsat agreement, to which the U.S. is currently bound.

Five firms have announced plans to construct private-sector satellite communications routes — Orion Satellite Corp. in New York; International Satellite, Inc., based in Alexandria, Va.; Pan American Satellite Corp., located in Washington, D.C.; Cynosat Satellite Corp. in Rockville, Md.; and RCA American, which is a subsidiary of RCA Corp., in Washington, D.C.

CORRECTIONS

The correct address for Management Control Systems, Inc. [CW, Nov. 12] is P.O. Box 723597, 2400 Lake Park Drive, Atlanta, Ga. 30339.

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CW at IBM Large Computer Market: IBM plans to meet the demand for large systems by entering new markets, pricing aggressively and continuing to offer leading-edge technology... IBM's 370 architecture is an industry standard, but will probably evolve into a System/38-type architecture/12-13

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NEWS

Amdahl dual-system hardware runs to mixed reviews

Multiple Domain Feature sparks interest, but some users question option's purpose

By Jeffrey Bosker
CIVIL Service Bureau

Users and analysts appear sharply divided in their assessments of a recently announced hardware option that reportedly allows two operating systems to reside simultaneously in the same Amdahl Corp. mainframe.

Some industry professionals consider Amdahl's Multiple Domain Feature (MDF) conceptually interesting and expect it to find assorted applications, especially among customers planning to convert to IBM's Extended Architecture or wishing to combine time-sharing and batch jobs under one processor.

But others give the hardware feature lukewarm reviews, question the desirability of some of its target uses and wonder aloud about the product's ultimate purpose.

Support of like, unlike pairs

Introduced late last month [CW, Dec. 3], MDF consists of printed-circuit boards and microcode that reportedly enable Amdahl's 580 series mainframes to concurrently support IBM's MVS/370, MVS/XA and VM/HPO in any combination of like or unlike pairs.

Under MDF, each operating system occupies its own logically separate domain, which alternately turns on and off at intervals defined by the user.

When one domain shuts down, the other is automatically activated and gains full access to its resident mainframe's internal memory, channels and other processing resources. Although the constant switching between domains creates some overhead, each operating environment reportedly provides at least 95% of native-mode performance.

Relevance for users

But what does the product mean for users, and to what extent might MIS organizations find it useful?

Val Grenillion, manager of automation planning for the Federal Reserve System's Board of Governors, said that because it works solely with 580 series mainframes, MDF is currently inapplicable to the Federal Reserve Board, which uses no Amdahl CPU larger than a 470V/2.

But if the board someday were to upgrade to a 580 machine and convert to an Extended Architecture system, the hardware option and its ability to support two operating systems simultaneously might suddenly come in handy, he said. As an Extended Architecture conversion tool, MDF would probably merit consideration alongside IBM's VM Migration Aid, which basically does in software what the Amdahl product does in circuitry, he said.

MDF might also appeal to user organizations that would like to run their time-sharing applications under VM and their batch-production jobs under MVS. Such organizations, Grenillion said, "could support both environments on a single processor rather than having a separate machine for each."

Some users 'exceptionally nervous'

Not everyone, however, sees the consolidation of unlike operating environments as desirable or wise.

Some users, fearful of putting all their eggs in one basket, would become "exceptionally nervous" if they placed their production and test systems on the same mainframe, according to Jack Hart, director of professional services at International Data Corp., a Framingham, Mass.-based research firm.

Hart also sees another potential disadvantage of having two dissimilar control programs running on the same processor.

If, for example, one of the operating environments in an MDF-equipped machine was running time-sharing applications under VM, users

would periodically have their service interrupted as control shifted to the other domain, he said.

On the other hand, Hart added, users who now have different copies of the same operating system on separate machines might save "a significant piece of change" by using MDF to consolidate programs and eliminate redundant software licenses. If the mainframe supporting the dual environments has the capacity, a consolidation of like operating systems could also eliminate unnecessary hardware and its attendant costs.

In general, though, MDF appears

to be "no big deal, no barn-burner," Hart said. "Unless we're overlooking something, we're not sure what problem Amdahl was trying to address with this product."

"My guess is that their intent is to persuade users to turn in their existing IBM systems and buy a big Amdahl machine instead of a second IBM processor."

William Easterbrook, vice-president of the brokerage firm Kidder Peabody & Co., claimed to have little familiarity with MDF but described it as a potentially good feature for users who want to "unhook" and replace an existing system.



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NEWS

Retailer opts for interactive system to train buyers

Inventory control specialists to use system to get quick order response, cut inventory

By Edward Wimmer
CW Staff

NEW YORK — With 1,400 employees to train on its mainframe-based Buycorn merchandise purchasing program, the retailing giant J. C. Penney Co. could have hired a crew of teachers and cleared out an office at its headquarters here for classroom space.

It didn't. Instead, it bought personal computers, laser disk players and touch-screen terminals, the key hardware ingredients in a self-paced instructional program developed for the Buycorn program by Interactive Training Systems (ITS) of Cambridge, Mass. The hardware will run ITS software and laser disks to provide instruction in a system that J. C. Penney buyers and inventory control specialists will use to get what the retailing firm hopes will be quicker responses on orders and a reduction in inventories.

The training program, which is currently in pilot testing, is distinctive, ITS President David Barber said, because of its interactive features. It quizzes students as they use the system, records and graphs their answers and refers them to review lessons when their errors become too numerous. It even lets students run "what-if" simulations on Buycorn itself, testing the potential outcomes of

their buying strategies and recording their decisions on the training program. The students use a nonproduction portion of the system set aside for the simulation.

Full-scale training use

J. C. Penney will begin full-scale use of its Buycorn training in April 1985, using 36 learning stations in the firm's newly established learning center at its headquarters here. Each learning station, which will run the program's training modules, consists of an IBM Personal Computer, ITS controller, touch-screen color monitor, laser disk player and Buycorn terminal. Each of the program's 15 modules, a full 36 hours of study, is stored on a diskette and a companion laser disk.

Barber said the Buycorn training program is the largest single program designed by ITS. His firm spent eighteen months studying the Buycorn system and authoring the course's first three modules, he said. At the same time, however, ITS also trained several J. C. Penney employees, drawn from four departments, in Authority, the ITS courseware authoring language. The J. C. Penney employees eventually produced the remainder of the course.

Some 24 J. C. Penney employees were involved in the course's development, explained Ted Boggio, the

retailer's manager of merchandise systems training. The Buycorn system, which has dial-up connections to several J. C. Penney suppliers, took three years to develop and controls the purchase of about \$13 billion worth of merchandise annually, Boggio noted.

It will be accessed via terminals by 1,400 J. C. Penney employees, 1,200 of them at headquarters.

Most Buycorn users will be divisional merchandise managers, buyers and inventory control specialists, Boggio said. However, he noted, upper-echelon managers will not need to take the entire course; instead, they will learn about the portion of Buycorn to be relevant to them. "The beauty of interactive training is [that] you can develop this huge, comprehensive course and tailor it to

those who are to use it," he said.

Two other advantages of the training program, Boggio added, are that it "does not rely on whether the instructor is having a good day," and that it provides constant testing and feedback to students. The course administrator, meanwhile, can generate a bar graph based on a student's performance on different modules.

Though Boggio said that J. C. Penney has no plans to disseminate the Buycorn training program to its 1,250 stores, ITS' Barber pointed out that J. C. Penney's new in-house program developers and ITS program development equipment could allow the firm to develop future training programs specifically for store employees.

"You've got the engine there," he said. "All you have to do is send out the video disks."

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Try to train

A. J. Barber, ITS President

CAMBRIDGE, Mass. — Based training combine the best in instructional design and custom software development, and provide access to the confounders of instruction, Learning Systems (ITS), a producer of video-based learning programs in everything from Auto programming to landing jet fighters.

An example of good educational instruction, Lehigh University, Lehigh, cited Barber's direct, a program for which he and ITS partner, Terry Leisher, served as consultants. "The basic concept behind the Lehigh direct instruction was that the student learns what you had to focus on," he explained in a recent interview. "Education had traditionally focused on content; [it had] forgotten that the real issue is how do I manage the situation of my student?"

To manage student attention, ITS programs combine color video screens — a manager talking, a pilot landing a jet, a computer moving through a firestorm — with instructional software running on an IBM Personal Computer. The computer, which asks the questions and presents the lesson, and a laser disk player, which runs the video lessons, are linked using an ITS controller.

The student, meanwhile, interacts with the training program by touching the appropriate screen on a touch-sensitive monitor or by answering questions — a line of data, presented only by computer. The program's developer, Barber, is the U.S. Army's chief of the

ITS program combine color video screens with instructional software running on an IBM Personal Computer.

ITS, however, is hoping to expand out of the custom-designed world and become a supplier of packaged off-the-shelf products for off-peak training, according to ITS President Barber.

The firm has a 37-month introduction to Unix, which has been sold to a number of customers. Barber's firm has a 37-month introduction to Unix, which has been sold to a number of customers. Barber's firm has a 37-month introduction to Unix, which has been sold to a number of customers.

What may be the most exciting ITS product to date, however, is its training course on flying a U.S. Navy F-16 fighter plane. The course simulates the flight characteristics of the aircraft before the pilot begins flight simulation training.

At the program's start, the prospective pilot is shown a display of the plane's instrument panel. Any part of the display that is touched activates an animation of that which is being shown. If the pilot touches the instrument panel, the animation shows the pilot's view of the instrument panel.

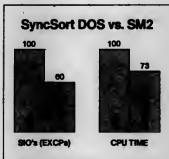
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SyncSort DOS

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NEWS

Manager's on-line design keeps New Yorkers rolling

By Charles Suberack
CW New York Bureau

NEW YORK — If you were responsible for the bus fleet here and had 860 buses that were prone to catch fire or suffer cracked frames, what would you do?

Computerize the repair records, said William C. Fortunato, mainframe manager for the New York Transit Authority's Surface Transit Information Division, and fortunately, that is what his department began to do in August 1980. Those records now serve as a frontline defense for the authority's decision to mothball its fleet of Grumman Flammable buses. (Grumman sold its Flammable division in 1983 to General Automotive Corp. in Ann Arbor, Mich.)

The federal Urban Mass Transit Administration, which helped purchase the buses, challenged the mothballing. The buses have been sitting in the Brooklyn Navy Yard since one of them caught fire in midtown Manhattan in February. The case is still in litigation, spokesmen said.

The Flammable incident helped justify the effort to create an on-line record structure for the bus fleet, said Cary B. Peskin, deputy director of the bus division of the Transit Authority and Fortunato's supervisor.

Regular maintenance intervals

Maintenance intervals for each bus are now part of an extensive fact-collecting process. If a bus breaks down, maintenance supervisors can go to the system and find out when the bus was last serviced and inspected, who did the previous repairs and what the problem was, Peskin said.

Through terminals hooked to an IBM System/38 minicomputer, mechanics in the Transit Authority's 22 service depots can find out when the engine coolant was last changed in each bus and how many miles have been put on each tire, he added.

Fortunato and his staff of 20 programmers frequently joke about the mundane details that are the objects of their programming efforts, but they are part of the support system that allows 1.5 million people to ride city buses each day.

'Learned to love diesel fumes'

Fortunato, 29, said he "just happened to be in the right place at the right time" for the post, and as for his qualifications, he said, "I rode the buses to school when I was five" and "learned to love diesel fumes" while working in a programming job at a bus repair depot.

He was a computer methodology major at Baruch College in Manhattan and joined the Transit Authority when he graduated in 1978. He recently finished a master's degree in business administration at the same school.

In Fortunato's, Brooklyn office, light from a lamp floods his desk while the windowless surroundings remain in semidarkness. His big ceiling lights are too bright for the small space, so he keeps them off. From this place he supervises the collection of information on the 4,500 buses that make up the city fleet. It is fed into IBM 3081 and 3082 mainframes in Manhattan.

Analyzing records for manufacturer liability

By analyzing records, his staff can determine whether there is any pattern to repairs that might

indicate the manufacturer should be held responsible. If 20% of the dome lights break on a shipment of new buses, for example, the problem might constitute a fleet defect, he said, which the manufacturer would have to correct.

"The city is pretty big. . . . We have millions of records out there. In the past, things would get fixed on an individual basis, and no one would be the wiser," he said.

The computerized record system also allows the use of spectrochemical analysis. Samples of fluids are taken from a bus and burned, and measurement of the resulting light waves indicate what elements are in the fluids; if engine coolant is detected in the engine oil, it is a sign of a broken seal. Metal particles in transmission fluid indicate a working part is deteriorating.

Fifty percent gain in fuel life

Without the spectrochemical analysis and computerized records, the maintenance crews had to replace engine oil and coolant every 6,000 miles. With them, the two fluids are replaced in most buses every 8,000 miles — a 50% gain in fuel life.

Each bus requires 32 quarts of oil and 36 quarts of coolant per change, so the savings have been considerable, but transit officials cannot say how much yet.

Mainly, however, the estimated 100-program record system helps system reliability, Fortunato said. When a bus breaks down, six months of service records are available quickly on a screen at the repair depot.

"The people who really need the information are getting it," he said.

Nynex, DG join forces to integrate voice/data switches with OA systems

NEW YORK — Data General Corp. and Nynex Corp. last week announced a \$66 million agreement calling for Nynex to integrate voice/data switches with DG office automation systems.

Under the agreement, Nynex's unregulated subsid-

ary, Nynex Business Information Systems, will package DG Eclipse MV superminicomputers running DG's Communications Electronic Office (CEO) with various switches already marketed by Nynex. CEO is an OA package that includes

spreadsheet, filing, calendar, word processing, decision support and calculator applications.

A Nynex spokesman said the systems, which will be tailored to the individual customer's needs, are intended to provide a complete OA and voice/data communications package.

Customers can choose from a line of switches now marketed by Nynex, including those made by GTE Business Communications Systems, Inc. and The Communications, Inc., according to the Nynex spokesman. He added that packages can be configured to provide all communications services except Inter-Local Access and Transport Areas service.

Nynex to use DG equipment

Nynex, which serves a market area of six million businesses in New England and New York, also will install the DG equipment and CEO software in its own sales and business offices.

The Nynex spokesman said pricing will be set this week and will vary according to the Eclipse system chosen. The Eclipse series supports up to 128 users but allows for interconnection of multiple Eclipse systems.

Nynex also will sell DG's 16-bit Executive Generation microcomputers and DG/One portable computers.

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Authors should include their telephone and a telephone number at which they can be reached.

The deadline for the February Special Report is Dec. 31.

If you have a story you would like to tell, or know you would like to speak on or on any questions you would like to ask, contact Janet Peltier, Special Reports Editor, Computerworld, Box 980, 375 Chestnut Road, Framingham, Mass. 01701.



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MCI Mail to adjust prices

WASHINGTON, D.C. — MCI Mail, a service of MCI Digital Information Services Corp., announced pricing changes and discounts for its electronic mail customers effective Jan. 1, 1985. An annual fee of \$18 will be charged to MCI Mail subscribers the first time such a fee has been assessed. Prices for MCI Mail letters sent short distances will be reduced 55% to 45 cents for up to 500 characters. New prices and a higher capacity will be applied to MCI Mail courier deliveries.

New volume discounts, ranging between 10% and 30%, will take effect for MCI letters and overnight mail. A new Executive 50 discount package for customers with more than \$50 per month in charges will provide a 5% discount, as well as a Free Advanced Mailbox that provides all MCI Mail services.

NEWS

COBOL

from page 1

nology a few years ago. "We looked at some canned packages, but they were not flexible enough for us," he said. "They could not provide us with features such as a 22-digit cost center."

The group experimented with and rejected three application development options: Basic, Dbase II and Microsoft Corp.'s Cobol. The system manager said that Basic and Dbase II did not possess powerful features. "Microsoft Cobol was not compatible with ANSI 74 standards, so it was difficult to determine what features were available," the system manager claimed.

A major computer manufacturer, which did not want to be identified, has been teaming Cobol and micros for more than four years. The company's central programming department develops and tests applications on the micro and uses a Ryan-McFarland Corp. cross-compiler to send the applications to an IBM 3083 mainframe, where they are compiled.

A system analyst at the company

"We can develop an application in one-fifth the time it previously required." — Jerry Purcell, Fluor Corp.

listed two reasons why programs are compiled on its mainframe: speed and data integrity. "To compile a 4,000-line program on a microcomputer can take as long as 45 minutes," he claimed. "To be productive, a person would need two or three microcomputers. That would be ridiculous."

Fluor alleviates response time problems by limiting most programs to approximately 1,000 lines of code and through the use of a syntax checking program. "We do most of our debugging with a syntax verification program," Purcell said. "Whenever a programmer compiles a program, he is fairly certain that it will run to completion."

Consequently, response time is not a major problem at Fluor. "With an [IBM Personal Computer] XT, four to six minutes are needed to compile a program, and 30 to 60 seconds are used for the syntax check," he noted. "With an [IBM Personal Computer] AT, this time is cut significantly."

The manufacturer stores Cobol source and object code on the mainframe. "There are control and security procedures available on the mainframe that the microcomputer does not have," the analyst said. "With the micro, one has to work with 150 floppy diskettes as backup."

The computer manufacturer has written a number of applications, including a program for its manufacturing plants. "Microcomputers control a number of activities at our plants, which are located throughout the world," the analyst said. "We wrote a general program for all our plants. Since it was written in Cobol, it can be altered in each country."

The next step at Fluor will be running the Cobol programs on a local-area network. "We would like to be able to have one person entering data while a second is testing a program," Purcell said.



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NEWS

WILSON

from page 1

willing to take their place, yet I couldn't. That rejection really hurt."

The pain was so great that she asked for a transfer from AT&T to Ohio Bell. "Initially, I was told that transfers were not allowed, but in three weeks I went to work for Ohio Bell," Wilson said.

Her first position was as a third-shift computer operator. Although interested in computer technology, she aspired to a management position. "I have always been more interested in people than machines," Wilson said.

To increase her knowledge of Ohio Bell's system and hone her managerial skills, she studied. "I am the type of person who always has her head in a book," Wilson claimed. As she advanced in her studies, she was

given more responsibility. In 1973, Wilson became an assistant manager, with four people reporting to her.

Her management style has been marked by a willingness to change policies even when change creates problems. "The operations function grew so that it was difficult to complete the work in six days," she said. "There was talk of a seven-day schedule that no one really wanted. I was assigned to implement it. As you might guess, that was not a popular change, but it was needed, and it was implemented."

As an Input Systems Output man-

ager, Wilson also altered the company's training program for operations personnel. "My area was responsible for [Sperry Corp.] and [Honeywell, Inc.] equipment," Wilson said.

"New employees were first trained on IBM equipment. We had to wait a few months before they would even begin to work with our system. I just did not see the rationale for that process, so I had the training department develop introductory Honeywell and Sperry courses."

Wilson's ability to communicate helped her accomplish tasks without alienating coworkers. "You always know where you stand

with Vivian," said Richard W. Gostlin, assistant manager for site planning at Ohio Bell. "She defines what she wants and tells you point-blank when you don't deliver it."

Wilson credited her entry-level experience with aiding her managerial skills. "Some people go right into management and never understand the needs of nonmanagement employees," she said. "With my experience, I can find something in common with any employee."

Two years ago, she recalled, one of her workers retired from Ohio Bell. Upon retiring, the woman sent Wilson a card thanking her for always taking the time to communicate. The former employee claimed that Wilson's cheerful demeanor was more important to her than anything else at the company. "She signed the card 'P.S. I hated you when I first worked for you,'" Wilson related.

Another asset is the wealth of experience she gained during her tenure at Ohio Bell. "Whenever there was an obscure problem with the system, she would correctly analyze it," Gostlin noted.

"I rely on her experience."

Her supervisor, Robert L. Windle, district manager of Input Systems Output, added, "I really rely on her experience. I would hate to think of working without her."

Wilson's experience and outgoing nature have landed her a job in which she now directs 71 employees and six managers responsible for the company's 2.5 million-bill-a-month billing system, billing data entry for the Northern Ohio area and the corporate microfiche system.

She has placed her unpleasant early AT&T experience behind her and reported only one minor problem at Ohio Bell. "There was tension between an supervisor and me," she said. "It reached the point where we had to have a closed-door meeting to air our feelings. The problem was not that I was black but that I was a woman. He didn't believe that women should work. Even though initially we had problems, I can't complain about the way he treated me. He gave me the best review I ever had."

Wilson has been active in the Cleveland chapter of the Black Data Processing Association, serving recently as its recording secretary. She has also found time to attend college, raise six children and work as bookkeeper for her husband's business.



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Data security topic of meet

LONDON — Experts in computer crime will speak here at the International Data Security Conference, Feb. 18-19. Sponsored by Open Computer Security Ltd., the conference is geared toward consultants, security system planners and senior executives of financial institutions. Speakers will include Carl Meyer, Ph.D., codesigner of IBM's Data Encryption Standard, and Dorothy Denning, Ph.D., associate professor of computer sciences and specialist in cryptography and data security.

More information is available from Maxine Gordon, Open Computer Security Ltd., 31-32 High St., Brighton, East Sussex, England BN2 1RP.

NEWS

Five-year Ansi effort yields data exchange standard

By Bryan Wilkins
CW Washington Bureau

BALTIMORE — Incompatibility of hardware and software is most familiar to system planners who are prone to exclaim, "I'm tired of this, and I'm not going to take it anymore." The electronic exchange of interindustry information regarding purchases and orders probably conjures up nightmares. If handshaking won't work within the industry, forget the external transactions.

However, with the publication this month of draft standards by the American National Standards Institute (Ansi) X12 committee, a five-year effort by users to establish peaceful coexistence in an incompatible hardware environment has borne fruit.

The draft standards for electronic business data interchange (EDI) were designed to facilitate order placements, the processing and receiving of information, shipment and receiving information, invoicing, payments

and cash applications.

According to Ed Flacher, chairman of the Ansi X12 committee and director of 3M Corp.'s information center, the number of industry groups that have joined in the effort to develop EDI standards has increased as the work has neared completion. "It's been hard. How do you satisfy that many people who all want to keep their own formats and designs?" asked Flacher, who recently reported on the work to the annual convention of the Transportation Data Coordinating Committee (TDCC) here.

Flacher told the convention that support for the draft standards has been expressed by associations representing the metals, banking, electronics and computer industries.

The Ansi X12 committee work has centered primarily on following the structure of the International Standards Organization's (ISO) Open System Interconnection architecture with its seven-layer communications protocol.

Specifically, the EDI draft standards comply with ISO layers six and seven only, according to Flacher.

The standards consist of transaction-set standards to define the procedural format and data content requirements for specific business transactions, such as purchase orders, a data dictionary that defines the precise content for data elements in building a transaction set and the transmission control standards.

Flacher said the successful adoption of the draft standards would depend primarily on their use by sup-

pliers and vendors of various products. He predicted, however, that third-party vendors, such as value-added communications companies, would probably be the logical choice for small businesses that want to perform data interchanges and avoid added costs of implementing hardware and software changes.

TDCC is acting as the secretariat of the X12 committee, and copies of the draft standard can be obtained for \$86 by writing to TDCC at 1101 N.W. 17th St., Washington, D.C. 20006.

Delaware succeeds in second try at automating bond sales

By James Connolly
CW Staff

DOVER, Del. — The state of Delaware's second attempt at eliminating paper in state and municipal bond sales last month succeeded where the first try failed.

State Treasurer Janet C. Rawnicki tried to eliminate paper bond certificates earlier this year [CW, Feb. 6] by assessing a \$50,000 handling fee on bidders who did not agree to use book entry or electronic registration of bonds. In that \$50 million sale, four of five bidders, including the low bidder, opted for paper and the surcharge.

But in the latest \$50 million general revenue bond offering, where the surcharge was quadrupled to \$200,000, three of the five bidders agreed to the book entry requirement. Those offers included a low bid of 8.89% annual interest by the winning bidder, Merrill Lynch & Co.

The sale was the largest book entry bond deal in the U.S., surpassing the \$10 million sale by the state of Utah in July, and will help make book entry the standard for state and municipal bonds, according to Rawnicki.

"It was an education process. There was a feeling that the individual wanted a paper certificate," Rawnicki noted. She said she ordered a study of bond buying patterns and found that almost all bonds were being purchased by institutions such as banks and insurance companies, often on behalf of individuals who never received or desired certificates. She said she also found that the financial industry misunderstood state regulations on book entry bonds and that there was no requirement for paper.

Under the book entry system, sales will be recorded under a single certificate at a depository. Merrill Lynch and the depository will then keep electronic records of the institutional and individual purchases. She

said courts will accept as proof of ownership records such as canceled checks and monthly statements.

According to Rawnicki, the benefits of book entry go beyond the state's saving printing and processing costs for certificates. She said the customer benefits by interest being paid automatically and because the state can easily break down large bonds for several buyers.

"Because we are doing it through the computer, we can change denominations of bonds from \$5,000 to \$1,000, which means letting people get into the tax-exempt market for a lot less money," Rawnicki said.

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NEWS

IBM readies to meet predicted large systems demand



OW AT
IBM LARGE
COMPUTER MARKET

By John Deacon
CW Staff

TARPON SPRINGS, Fla. — IBM's own customer surveys show that last processing, or millions of instructions per second (Mips), rates will grow at a compound rate from 46% to 47% in 1984 instead of the 35% that IBM previously predicted.

So said Daniel M. Culhane, IBM's manager of large systems in the national accounts marketing division, who spoke last week to an IBM Large

Computer Market Conference sponsored by the Gartner Group, Inc., a market research and consulting firm.

Since IBM began the customer surveys in 1979, actual Mips installed have consistently outstripped projections, Culhane said. Among the application areas most strongly driving growth today are graphics and image processing and engineering and scientific markets, he added.

'Dramatic business case'

"Those areas are probably growing enough so that even IBM could make a very dramatic business case" for getting into them, said Culhane of markets traditionally dominated by IBM competitors.

Also driving the market are projections that, by 1990, 70% of a white-collar labor force will be dependent on computers to do their jobs and that 13% of the gross national product will be spent on data processing-related expenses, Culhane said. "An inexhaustible amount of corporate money will be spent on DP," he said.

Most DP-related spending was once on mainframe-class systems, he explained. In 1980, 60% of DP spending was for mainframes, vs. a projected 35% in 1985, Culhane said.

Spending for desktop processors and minicomputers is up; desktop spending is rising from 6% of DP budgets in 1980 to a projected 20% in

1985, and minis from 17% in 1980 to a projected 21% in 1985, Culhane said.

More sophisticated end users are fueling the change, and growing DP markets are concentrated outside the host processing area, he suggested. "Real growth is achieved by tying the external areas back to the host," Culhane said.

Addressing system design, Culhane said IBM is designing CPUs with more field-replaceable units that can be plugged in and out quickly for faster servicing.

Self-diagnostics will be increasingly used to indicate which components are not working, and the defective component can be simply replaced in the field and repaired elsewhere, Culhane said.

'Settle for someone in a white shirt'

With such designs, service in the field becomes simplified; "Maybe you don't need a graduate engineer anymore," Culhane said, adding, "Maybe you can settle for someone in a white shirt who can replace a card without getting electrocuted." He also added, "I'm not saying that field engineers are going to go away."

Another design feature for water-cooled systems that has helped control CPU maintenance costs is the Thermal Conduction Module (TCM), Culhane said.

Dissipating heat is critical in systems that operate with cycle times below 27 nsec, such as the 3080 series, since excess heat can affect cycle timing, he said. A total of 138 microprocessor chips together can generate 300W of heat, Culhane said, noting the TCM was designed to remove up to 1,400W of heat.

Other areas addressed by Culhane included:

- **Chip technology.** IBM's research arm recently announced a chip with 10,000 bipolar circuits. When used in a personal computer, the chip could push micro Mips ratings to 2.5, Culhane said. While it would not appear practical now for micros to have that much power, the excess power could be consumed by protocol conversion, especially for communicating between processors, he suggested.

- **The 1M-byte chip.** Also recently announced by IBM. This could be used to increase main memory on CPUs in the field, he said, suggesting, "Productivity would go through the roof."

- **Market strategy.** In which IBM uses price to try to move users to the top of a CPU line. "We've developed what we consider a mousetrap. Once you buy one of these things, we're going to continue to try to adjust prices to get everyone to go all the way up ... to the top of the line," Culhane said.

He noted that IBM saves money this way, because it is easier for salesmen to move customers up processor lines than to different processors.

- **Operating systems.** IBM is committed to MVS/XA, VM and DOS/VSE through 1989, Culhane said. Of MVS, Culhane said, "MVS isn't going to be functionally stabilized; it's going to be functionally strangled. Less and less function, more and more to extended architecture," he said, noting

See SURVEY page 13

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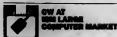
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NEWS

IBM seen moving from 370 to System/38 architecture



By John Deane
CW Staff

TARPON SPRINGS, Fla. — IBM will move away from the 370 architecture in a "gradual if not graceful transition toward the evolutionary target" architecture of the System/38.

That was the view of David L. R. Stein, general partner of Julian, Cole and Stein, who spoke at last week's IBM Large Computer Market conference here sponsored by the market research and consulting firm of the Gartner Group, Inc., of which Stein was a cofounder.

According to Stein, "the crystal ball is rather clouded" as to when

this movement will occur in earnest. One reason is that the plug-compatible market has not performed well of late, he said.

"IBM now has some options it probably didn't expect to have; [the company is] not being forced to move as quickly," Stein said. Stein predicted that when IBM announces the Sierra, its so-named successor to the 3090 series of mainframes, certain features will be withheld at first since IBM has no pressing need to announce them. Sierra features announced in late 1985 could encompass fiber-optic channels and new channel protocols, Stein speculated.

IBM, Stein claimed, learned a lesson in the early 1970s after announcing the 370 to succeed the System/360, with the 370 being "the same machine for half the price," Stein said. IBM did not offer the block multiplexer channel feature of 370 on

the 360, so plug-compatible manufacturers (PCM) developed a controller to keep the 360s current, he said.

"The entire installed base of IBM was incompatible with IBM's new standard," he said. PCMs took advantage of that to sell more of its own disk drives. "In a sense, IBM abandoned its installed base" to the PCMs, Stein said.

IBM today tends to retrofit new system features to most recent systems, so the installed base can support the same peripherals, making it harder for PCMs to compete, Stein indicated. Beyond PCMs, the real issue in Stein's view is how IBM can continue to carry on with its 370 architecture. "No one would be so brash as to suggest that 370 architecture will be here forever," he said.

In 370 architecture's evolution, Stein predicted, "DOS will die; it has no reason to exist. It was designed for small memory environments." Quoting Gene Amdahl, the entrepreneur who started Sunnyvale, Calif.-based Amdahl Corp., Stein said end-user investment in software is "so enormous that it forces gradual

architectural evolution."

If IBM made radical departure in architecture, it would benefit IBM's competitors by forcing unwanted conversions on IBM users, Stein suggested.

IBM instead will continue to rework its 370 architecture toward object-oriented architecture, in which the operating system generates I/O actions to handle transfers transparently to the user, as in System/38 architecture, Stein said. "That clearly has to be the objective for the 370." This process of evolving to System/38-type architecture may take two decades to reach completion, Stein said. The change requires a machine-independent interface between systems software and applications programs and abandoning device-dependent data, he stated. "The risk is enormous. If one makes too large an architectural change, the software can come down like a house of cards," he said.

To migrate customers to another architecture, IBM intends to support two environments simultaneously, Stein said.

SURVEY from page 12

the transition would be slow.

■ Sierra. In an apparent reference to what the Gartner Group is calling a delay in the announcement of the Sierra series, the top-of-the-line IBM mainframes expected in early 1986, Culhane said, "The X models haven't been out there that long yet. You've got to recover that development expense before you can really make your profit numbers."

■ Microcode. The hardware, software integration called microcode is misunderstood because it is complex and engineering-oriented, Culhane suggested. Loaded on a mainframe via a floppy disk, microcode provides software assistance and better performance, he said. For an MVS function, according to one test, a CPU with software only required 66 instructions and 332 cycles to process. With microcode, that function required one instruction and 70 cycles.

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NEWS

Data base system plays cupid for business expansion

By David Gilman
City Staff

In Durham, N.H., the creators of a computer "dating service" are bringing together lonely heart investors with entrepreneurs, hoping to attract more investment to the state.

In Atlanta, the Associated Builders & Contractors of Georgia, a trade association, is using a computer data base to match builders with contractors and to create more business for association members.

These are just two of the various organizations that have enlisted computers to promote business opportunities and improve their competitive advantage over rivals.

At the University of New Hamp-

shire (UNH) in Durham, the directors of a nonprofit network are trying to match entrepreneurs with investors. Information about investors and applications for investment from entrepreneurs are being stored in a customized version of Ashton-Tate's Dbase II data base program running on an IBM Personal Computer.

Network to help attract business

The project, called the Venture Capital Network, is operated by the Small Business Development Program at the university. Organizers of the network hope it will help New Hampshire compete with other states in attracting new business.

"The level of activity has been

well in excess of our expectations," said William Wetzel Jr., a UNH business professor and one of the network's directors. "It's been growing fairly rapidly."

Wetzel said about 100 investors throughout New England are participating in the project, which is centered on equity investment opportunities in the \$50,000 to \$750,000 range. Start-up investments of that size are usually too small to attract the attention of professional venture capital firms or the public equity market, he said.

Start-up companies have usually had to turn to the informal risk capital market to finance their ventures, Wetzel said. But entrepreneurs often

have difficulty locating these "informal investors." In the past, he said, the two parties have usually met "through a series of random events or the old-boy network."

An entrepreneur fills out a questionnaire with basic information about his business plan. The computer is then used to match the entrepreneur's plan with the investors' requirements, Wetzel said.

Confidential process

When both parties' criteria match, the investor is provided with additional information about the plan. The process is confidential until such time as the investor asks to meet the entrepreneur, Wetzel said.

"We couldn't do this without computers," he noted.

Although the network has already matched a number of potential investors with entrepreneurs, only one deal has been consummated, Wetzel said. Although he declined to disclose the identities of those involved, he said the entrepreneur of the high-technology venture is receiving \$100,000 to \$200,000 in start-up funds.

The Associated Builders & Contractors computer service was begun in May 1984. One of its main purposes is to give association members a competitive edge over a rival AFL-CIO-affiliated construction union in winning building contracts, according to Robert Graham, executive director of the Atlanta association.

Graham said the Construction Buyers Service Center is an offshoot of a similar computerized data base kept by the association's national headquarters.

"We got a little more specific with it and tried to tailor it to our contractors, to the type of projects that typically are built in Georgia," Graham said.

The data base program, called Fileman, was custom-written for the association by Computwork, an Atlanta software development firm specializing in insurance applications. The software runs on an Ohio Scientific, Inc. personal computer.

Association members complete questionnaires providing information about their firms, including the type of construction in which they specialize, their largest clients, recent projects and bonding capacity. That data is entered into the computer and matched with information about specific construction projects.

Matching builders with contractors

"What we try to do is match up the needs of builders who are looking for contractors with those contractors" who fit the builders' requirements, Graham said. Builders are sent a profile summary of potential contractors, and the rest is up to them.

"It doesn't do anyone any good to be talking to someone about a job that may involve \$2 million to \$3 million of electrical work on a project if all the contractor does is small residential electrical work," he noted.

The matching effort would have been impractical without the computer, Graham explained. "We would have had to keep [paper] records on every contractor, then when we got a request, manually go through each and every one of 370 companies to try and match them up."

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NEWS

IBM forms organization to handle Rolm acquisition

ARMONK, N.Y. — As part of a realignment of its three major business groups, IBM last week formed an organization to oversee recently acquired Rolm Corp. and related telecommunications businesses.

The new Telecommunications Products organization will be responsible for coordinating IBM's efforts in voice and private branch exchange (PBX) telecommunications and for marketing those products. The new group also will direct IBM's joint marketing program with Satellite Business Systems (SBS), a company in which IBM recently raised its ownership stake to 60%. Actua Life & Casualty Co. owns the remaining 40% of SBS.

IBM's \$1.26 billion acquisition of Rolm was approved last month by Rolm shareholders and the U.S. Justice Department. IBM and Rolm have agreed to a Justice Department provision requiring the divestiture of Rolm's military computer business (CW, Nov. 26).

In a statement, IBM Chairman John R. Opel said the changes "will enhance our focus on several key areas of the business and better position us for future growth."

IBM said it is realigning the Information Systems and Communications Group and forming an Information Systems and Products Group. The

changes are effective Jan. 1.

Under the realignment, the Information Systems and Communications Group will oversee the Communications Products and Entry Systems divisions, the Industrial Systems organization and the new Telecommunications Products Division. Its responsibilities include the Personal Computer line.

Stephen R. Schwartz, formerly president and chief executive officer of SBS, has been named assistant group executive in charge of the Telecommunications Products unit. Schwartz will be succeeded at the satellite company by Marvin L. Mann, an IBM vice-president and general manager at IBM's products business unit in Lexington, Ky.

However, the Information Systems and Communications Group will no longer be responsible for the Information Products and Systems Products divisions, which will now come under the wing of the new Information Systems and Products Group. This group will be responsible for low-end information processing systems, including the System/36 mini-computers, copiers, automated teller machines and typewriters.

Frank Metz Jr., an IBM vice-president, has been named group executive in charge of the Information Systems and Products Group.

MIS director role redefined

Spread of desktops, expansion of duties change function of information managers

By Charles Babcock
CW New York Bureau

NEW YORK — The year 1984 was a transitional year in which the role of the MIS director underwent fundamental changes, according to the executive director of the Yankee Group, a Boston-based research firm.

Dale Kutnick said users of the corporate data base have spread far beyond the walls of the data processing center. The MIS director, instead of serving as the high priest of information systems, is now subject to multiple demands for information services. Kutnick made his remarks at a recent annual briefing of the Yankee Group here.

Kutnick emphasized service. The proliferation of desktop computers and end-user computing "forever changes the role of the MIS director," he said.

"We see MIS changing through the end of the decade. . . . We see management information services enabling end users to get access to the data that they need," he said.

Today's end users are "fundamentally different from the programmers and techies" that MIS departments tended to deal with in the past, he added.

A second major responsibility that was passed on to many MIS depart-

ments in 1984 was overseeing the company's communications as a replacement for the broken-up AT&T. Kutnick said that as MIS departments assume a stronger role in communications, they will start building combined voice and data transmission networks.


Growth of micro

The growth of microcomputers, departmental minicomputers and networks has increased, not lessened, the demands on the corporate mainframe, Kutnick said. A Yankee Group survey showed that users' large system millions of instructions per second (Mips) requirements are expanding at an annual rate of 35% to 45%, the equivalent of a new IBM 9081 mainframe every six months at a large site, Kutnick said.

The increase is being generated by use of information centers, fourth-generation languages, application generators, end-user data base management systems (DBMS), query facilities, more complex applications and networking. "Networking is not cheap," he noted.

The Yankee Group estimated that about 1 Mips of mainframe power is consumed for every seven to 10 concurrent personal computer users tied to it.

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NEWS

Financial skills let DP execs speak corporate language

By Kathleen Burton
CW West Coast Bureau

SAN FRANCISCO — Why do computer professionals need to develop financial planning as well as data processing skills?

This question was the subject of a management tutorial at the 15th annual International Conference on the Management and Performance Evaluation of Computer Systems here last week.

According to Anthony M. Abowd, tutorial chairman and founder of Data Strategies, Inc., a financial consulting firm based in Chicago, many DP professionals are technically proficient but lack the basic financial skills and jargon necessary to bring

their future hardware planning and computing needs to management's attention effectively. Consequently, management often fails to make effective business decisions based on the DP department's real needs.

Another problem, according to Abowd, is that computer managers are often isolated from the corporate mainstream. To change this, he said, computer managers must start speaking the language of corporate managers, rather than a confusing "Tower of

Babel" computer jargon. This is especially important at budget decision-making time, Abowd said, when corporate managers are often inundated with myriad projects

needing approval and often rank them quickly according to arbitrary financial measures.

Another factor for MIS managers to remember when pushing for project approval or additional equipment is understanding the corporate psyche, he said.

Corporate managers are like owners of sports teams preparing to

draft new talent, he said, with each new proposed project akin to a draft-tee's being considered for the prospects of corporate success next season.

Two basic questions

Abowd said there are two basic questions to answer when proposing increased DP needs to management, namely: How will the increased computer capacity fit in with the overall business of the company? And, how will it impact the company's bottom-line return on investment?

MIS professionals have become expert at measuring costs, but they are not strong at measuring bottom-line returns, added Hershel Pearl, a Data Strategies partner who cochaired the session.

DP professionals are also proficient at factoring in direct project costs, such as hardware, programmer requirements and software development charges, Pearl said, but are lacking in estimating trickle-down, indirect costs, such as unforeseen overhead, support staff and electricity and air conditioning expenses. This serves to undermine the credibility of DP managers who, based on these omissions, often submit incorrect financial figures to upper management.

Two simple methods can turn computer proposals into financial proposals, Pearl said. The first method is to show how additional computing power can increase sales. The second method is to show how computing can reduce company expenses. Both methods, he said, talk about dollars, not computers, relate computing to the primary business and take into consideration the bottom-line company profits.

Appeals court refuses to throw out MCI case

CHICAGO — The U.S. Court of Appeals has refused to throw out the antitrust case won by MCI Telecommunications Corp. over AT&T four years ago, setting the stage for a trial on the extent of damages next month. The appellate court previously threw out a \$1.8 billion award.

MCI has filed a new claim that it has suffered \$6 billion in lost profits, which it said were the result of hindered connections to AT&T legally required by Federal Communications Commission policies. MCI said that due to the lost connections, it was unable to expand its public-switched long-distance voice business that it was in the process of establishing.

MCI has stated in court documents that \$2.5 billion of the damage claim is attributable to lost regular public-switched service and \$2.5 billion attributable to lost private-line revenues.

MCI has completed an internal study that makes the case for the additional lost revenues and has presented it to the court.

AT&T failed in an attempt to bar the new study.

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NEWS

DP alchemists in quest for applications gold


**PRODUCT
SPOTLIGHT**

DEVELOP from page 1

ing. For example, in the July issue of its monthly journal "System Development," Phoenix-based Applied Computer Research, Inc. (ACR) released the findings of a survey of 125 large development shops that showed an average applications backlog of more than 27 months. Similar shops surveyed three years ago indicated a backlog of only 19 months.

"So in spite of the rise of information centers and end-user computing, it appears that backlog continues to get worse instead of better," the ACR report stated.

Into this environment, enter application development systems — those software tools designed to simplify and standardize application development and improve programmer productivity.

■ Some application development systems work by actually generating code on the basis of input requirements.

■ Others provide for the automated functional linkage of individual programs coded in traditional languages.

■ Still another class provides a higher level language — so-called fourth-generation languages — housed in a development environment intended to speed the development process.

But defining what exactly constitutes an application development system is the rub. This article looks at the following three main product types:

- Program generators.
- Application generators.
- Fourth-generation language-based, production-quality application development tools, as opposed to the more end-user-oriented fourth-generation language products.

Not considered are the multitude of other productivity tools that address more specific and limited tasks in the development process.

Drawing a dividing line between program generators and application generators is not done without difficulty. A report prepared by Framingham, Mass.-based International Data Corp.'s (IDC) Information Systems Planning Service described program generators as products that produce stand-alone programs, typically in Cobol or PL/I.

Application generators, the study said, produce

'In spite of the rise of information centers and end-user computing, it appears that backlogs continue to get worse instead of better.'

— Applied Computer Research, Inc. statement

programs that continue to require software support from the generator, usually from a runtime monitor, to execute the programs. They generally interface with a data base management system (DBMS), often the vendor's own product, and a data dictionary and generally feature a fourth-generation language.

"In general, program generators are more appropriate for an application that will consume a lot of computer power, the bread-and-butter applications that are run all the time. But a large portion of an organization's applications use a much smaller portion of computer resources — the one-time reports or ad hoc applications. The application generators are suited for those," said Ellen Staelen, senior software consultant for IDC's Information Systems Planning Service.

A problem many prospective users face is that a

variety of products fall under the heading of application generators, a relatively new industry buzzword. "Within the mainframe world," Merlyn said, "I am not sure there are any true application generators. That is a term that covers a number of different products that assist in developing major application systems. The term may once have had a precise meaning, but you will find some very different solutions all under the application generator heading." Merlyn's firm, Walker Interactive Products, headquartered in San Francisco, expects to release its Strategic system application development system in approximately one year.

Even IDC's definition is not without opponents. Steven Pfenninger, president of Encino, Calif.-based IMS Consulting, Inc., said, "I cannot agree to [IDC's] delineation. It is just not workable. I know several products that do the same thing, but some have runtime monitors and others do not. I would call them all application generators. An application generator is a tool used by a programmer to develop applications. I understand the semantics problem, but I do not think that distinction is a proper one."

Thomas O'Flaherty, principal consultant for the market research firm Input, Inc. in Mountain View, Calif., echoed Pfenninger's dissatisfaction with IDC's product breakdown. "In reality, there is not all that much difference between program generators and application generators. The application generators, in principle, allow you to map out entire applications within the context of the generator, as opposed to individual programs. But I am not certain many users know how to utilize that aspect of the product in practice."

Whatever the definition, the market for professional programmer-oriented application development systems is certainly viable and growing. IDC estimated that large-scale systems users spent some \$126 million on independent vendors' program design/development tools this year, an increase of nearly 50% over last year's expenditures.

See DEVELOP page 22

SELECTED APPLICATION DEVELOPMENT SYSTEMS FOR THE IBM MAINFRAME ENVIRONMENT*

	Applied Data Research, Inc. ADSD/Advent	Chaos Systems, Inc. Mondo	Cullinet Software, Inc. Application Development System-On-line (ADS/OL)	Heugan Systems, Inc. Uniquely	IBM SRL Application Development Facility-2 (SADAF-2)
Mainframe software environment	OS, DOS, MVS, CICS, ADSD/Advent/OS	OS, MVS, DOS/VSE, CICS, TSO/DC, CICS/VS, VS/VS, DB/1, RPL, TSO, TSO/VS	OS, DOS, VM, CICS, TSO, IMS/DC, KMS/VS	OS, MVS, DOS/VSE, CICS, IMS/DC, DB/1, RPL, VS/VS	OS, MVS, SRS/VS
Generated or interactive code generated	Compiled	Not applicable	Compiled	Not applicable	Interactive
Assembler code modules utilized for code runtime	Yes	No	Yes	Yes	Not applicable
Data entry language provided	No (uses ADSD/Advent Query)	No (uses CICS/VS TSO)	No (uses Cullinet On-line Query)	No	No
On-line testing/diagnosing facilities	Yes	Yes	Yes	Yes	Not applicable
Documentation generated	Application components documented and listed in data dictionary	Automatic generation allows user to be interacted with program logic; prompter facility allows additional documentation request	Full cross-referencing information and business stored in data dictionary	On-line process control dictionary contains information in such areas as transaction flow and data groups and structure	Rules documentation creates hard copy of contents of applications implemented
Provided commands/routines for data base calls and communications interfaces	Yes	Yes	Yes	Yes	Yes
Target user	Professional programmers and experienced users	Professional programmers and end users with some programming experience	Professional programmers	Professionals; programmers; some facilities for end users	Professional programmers

* The above list is intended to represent a sampling of the major application development systems available for the IBM mainframe environment. The products described were selected for inclusion on the basis of available market research and interviews with industry consultants and researchers.
 * By process of this report, a program generator is defined as an application development system that produces stand-alone programs. A fourth-generation language application development system is defined as an application development system that produces programs that continue to require software support from the generator in order to execute the programs. A fourth-generation language application development system is defined as an application development system that produces the vendor's fourth-generation programming languages.

NEWS

Tools aid appliance firm's applications development

Despite the fact that the application backlog continues to grow at Amana, Iowa-based Amana Refrigeration, Inc., Donald Jones feels that Panaphic Systems, Inc.'s Gener/OL has simplified much of the software development effort there.

"It seems that the backlog would keep growing no matter what type of tool we had," said Jones, who is manager of programming and procedures for the home appliance manufacturer. "Much of the backlog consists of batch programs, so Gener/OL won't help us. But it has helped us a great deal with our on-line applications development. In addition, it has speeded up debugging and testing. There are many on-line programs that we would otherwise have spent four or five days on that we can develop with Gener/OL in one day."

Jones said about half of his 13-member development staff works with the Gener/OL application development system, which runs with IBM's DL/I under DOS/VSE and CICS on an IBM 4381 Model 2 at Amana Refrigeration's headquarters in Amana. The firm brought Gener/OL in-house in early 1983 and has since used the product to develop several software systems that Jones described as production-quality applications. One is a marketing information system linked to

a data base that provides terminal users with inquiry capabilities to sales information by such levels as product class and model.

"The marketing system application is a fairly large-scale one that includes a number of batch portions," Jones said. "I estimate that it would have taken us 20% more project time to complete the on-line portions without Gener/OL. There have also been no noticeable efficiency problems due to Gener/OL."

At John Hancock Mutual Life Insurance Co. in Boston, the use of Panaphic Systems' Telon for IBM's IMS/DC and CICS has also aided system development on the company's IBM 3090 series mainframes under MVS/XA. Telon was formerly a product of Christensen Systems, Inc., which was recently acquired by Panaphic (CW, Nov. 19). According to Robert Mengell, senior technical programmer in Hancock's Technical Services Division, Telon has reduced hand-coding requirements, facilitated high-level prototyping of applications and provided testing facilities that aid in debugging.

"Basically, we have used Telon to develop a number of standard insurance-industry-type applications."

See PANAPHIC page 22

IBM maintains stronghold despite product weaknesses

By John Gellman
CW Staff

In a 1983 study of IBM CICS application development systems conducted by the Merlyn Corp. consulting firm (CW, Oct. 11, 1983), 33% of IBM Development Management System (DMS) users said they would not recommend that product to others. In addition,

users queried by the Merlyn Corp. ranked DMS poorly in terms of overall capabilities.

The study findings were supported by industry analysts interviewed by Computerworld who also criticized both DMS and IBM's ADF-II for lack of functionality. Yet both products continue to be leaders in rankings of installed application development systems.

"As the song goes, it's just three little words — International Business Machines," said Thomas O'Flaherty, principal consultant for Input, Inc., a Mountain View, Calif.-based market research firm. "The first thought of many users is to go with whatever IBM offers. They know IBM will never let them down completely, so it is a safe bet. However, despite the dominance of those products, IBM has not been as strong in this [productivity tools] area as it has been in some others,

simply because its products are not that good."

Ann Morley, senior software consultant for International Data Corp., a market research firm based in Framingham, Mass., agreed with O'Flaherty. "People use a lot of IBM software simply because it comes from Big Blue. It has that Good Housekeeping seal of approval on it. In addition, their application development products have been on the market longer than many of those supplied by the independent vendors."

"To be fair," Morley continued, "many of the products we compare [DMS and ADF-II] to are newer and embrace more advanced architecture. That is not a fault of IBM. But IBM does not have to be the best to win market share; they just have to have something adequate. Many users know there are better tools out there, but they stick with IBM anyway."

That situation may be changing. Analysts agreed that independent vendors are gaining ground in the application development system marketplace, though not always at IBM's expense.

"I think the business is big enough so that there is room for everyone to gain ground," said T. Cappers Jones III, manager of the application management practice at

See IBM page 19

SELECTED APPLICATION DEVELOPMENT SYSTEMS FOR THE IBM MAINFRAME ENVIRONMENT*

	Panaphic Management Systems/CICS/VS (IBM/CICS/VS)	Information Services Corp. Telon V	Leading Software Technologies Corp. The Intelligent Assistant	McGraw-Hill/Bridge Corp. Attention: Systems Development Tool (SDT)	Reliagraphics, Inc. Reliagraphics
Product description (brief)	OS, DOS, CICS/VS, Vsam	OS/VS, DOS/VSE, CICS/VS, IMS/DC, IMS, Vsam, Isam	OS/VS, MVS, CICS, Vsam	OS, DOS, CICS, MVS, Vsam	OS, DOS, CICS, Vsam
Mainframe software environment	OS, DOS, CICS/VS, Vsam	OS/VS, DOS/VSE, CICS/VS, IMS/DC, IMS, Vsam, Isam	OS/VS, MVS, CICS, Vsam	OS, DOS, CICS, MVS, Vsam	OS, DOS, CICS, Vsam
Program generation	Visual and/or free-form	Free-form	Free-form	Free-form	Free-form
Completed or interactive only (completed)	Interactive	Completed	Completed	Interactive	Completed
Batch processing	Batch	Batch	Batch	Batch	Batch
Assistant code modules utilized for common routines	Not applicable	Yes	Yes	Yes	Yes
IBM 4381	No	No	No	No	No
Batch queue language provided	No	No (uses Information Services Corp. Telon V)	No	Yes	No (uses Reliagraphics Images)
Screen design	Yes	Yes	Yes	Yes	Yes
On-line testing/debugging facilities	Yes	No	Yes	Yes	Yes
Security	Yes (in application environment)	Yes (in application environment)	Yes (in application environment)	Yes (in application environment)	Yes (in application environment)
Documentation generated	File and panel description, forms, calculation and edit forms, data transfer forms	Design manual with processing information, the usage and screen flow summary, screen data information, screen layout, the format and source listings	System description with CICS, VSAM, ISAM, system narrative, I/O specifications, report formats, program narratives, master file descriptions, screen layouts, CICS control code listings	Data dictionary updates, screen and processing program documentation	Screen documentation, program documentation with source code and comments, file layout reports
Programming flexibility (number)	No	Yes	Yes	Yes	Yes
Postprocessed execution/report for data base calls and non-transactional interfaces	Yes	Yes	Yes	Yes	Yes
Access to data base	No	No	Yes	Yes	Yes
Target user	Professional programmers	Professional programmers	Professional programmers	Professional programmers and end users	Professional programmers
Price	\$100,000/yr. (1984)	\$100,000/yr. (1984)	\$100,000/yr. (1984)	\$100,000/yr. (1984)	\$100,000/yr. (1984)

* The above list is intended to represent a sampling of the major application development systems available for the IBM mainframe environment. The products described were selected for inclusion on the basis of available initial research and interviews with industry consultants and executives.

* For purpose of this report, a program generator is defined as an application development system that produces stand-alone programs. An application generator is defined as an application development system that produces programs that continue to rely on software support from the generator to better to execute the programs. A fourth-generation language application development system is defined as a development environment/architecture based on the vendor's fourth-generation programming language.

OW 0287

NEWS

SELECTED APPLICATION DEVELOPMENT SYSTEMS FOR THE IBM MAINFRAME ENVIRONMENT*

	Radco Computer Software Co. 1980	Radco Software Corp. 1979	Posselt Systems, Inc. 1980/81	Posselt Systems, Inc. 1980	Saga Systems, Inc. Apparelstar Productivity System, 1980 (1979-1980)	Software Ad of North America, Inc. 1980
Multiple software submodules	DOA/MS, OA/MS, CCS DL/I, Vase	DOA/MS, OA/MS, MSY, CCS, SAS/DC, DL/I, SAS, Threat, SOL, Address, OMS/R, ADP/Customary/DB	SOL/MS, OA/MS, MSY, CCS, SAS, SAS/R, Total	DE, MSY, MSY/SA, CCS, SAS/DC, TSO, SAS/OF, Vase	DE, MSY, MS/CM, CCS, SAS/DC, TSO/MSY, SAS/OF, DL/I, Vase	MS/CM, CCS/MS, OL/MS, MSY, MSY/SA
Compiled or interpretive only (optional)	Compiled	Interpretive (optional-compiler)	Compiled	Compiled	Compiled	Interpretive
Assembler code modules utilized for common routines	No	Yes	Yes	Yes (optional)	Yes	Not applicable
Basic query language provided	No	Yes	Yes	No	No	Can be used for data query, per vendor
On-line testing debugging facility	No	Yes	Yes	Yes	Debugging only	Yes
Documentation generated	Hard-copy screen layouts and file and element definitions; information extracted from data dictionary to produce user manuals	No automatic generation	Complete on-line documentation	Cross-reference reports with information on data access and exit points	Screen documentation; programmer reports with I/O information; screens, data base reports and views and fields; session control reports	No automatic generation
Profitted commands/instructions for data base base code and communications interfaces	No	Yes	Yes	Yes	Yes	Not applicable
Target user	Professional programmers	Professional programmers; and users can utilize executive inquiry facility	Professional programmers	Professional programmers	Professional programmers	Professional programmers and sophisticated and users

^a The choice for the literature to represent a sample of third-party application-development systems available for the IBM runtime environment. The products described were selected for inclusion on the basis of available market research and interviews with industry consultants and researchers.

2000

Micro as workstation queried

Most vendors do not support off-loading to micro

While microcomputer-based development — or programmer — workstations have become a hot topic in software organizations, whether or not the current generation of application development systems adequately supports the off-loading of development tasks to micros is debatable.

More than two-thirds of the vendors interviewed by *Computerworld* said they currently do not support micros as workstations. Some experts even wondered whether in-house software development centers are prepared to use micros as workstations.

"A lot of companies are betting that they can make use of workstations," said Steven Pirenne, president of IMS Consulting, Inc. "It is an issue that is getting hotter, but it has not been addressed by most shops yet. ... All the vendor companies are looking to



micro versions of their products, and I have seen some functions moving out to the micro. But the actual generation portion of development still takes place at the host today."

Others complained that today's application development systems do not address the development of systems designed to operate across processor types.

"The [productivity] tools for the mainframe industry do not integrate the micro into the development scenario," said Vaughan Merlyn, vice-president and general manager of the systems software division of Walker Interactive Products, Inc.

"They also do not accommodate the reality of the future integration of mainframes, minicomputers and micros."

"My suspicion," O'Flaherty said, "is that IBM may leapfrog the competition and come up with the first product that addresses applications that extend over microcomputers, minicomputers and mainframes. . . . Users are building these cross-machine applications, and they are asking for support."

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IBM from page 18

the industry research firm of Nolan, Norton & Co.

What is Big Blue planning for the future? Many insiders predict that IBM will announce an application development system to support its recently announced DB2 data base management system or at least extend the functionality of one of its products to service that environment. But the industry giant may have other moves in mind.

157
June 22, 84
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Michigan Bell Telephone 45⁰⁰
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Paul Hamaen
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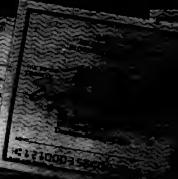
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NEWS

DEVELOP from page 17

(see chart page 25). By 1986, that figure will more than double to \$268 million, IDC predicted, and will reach more than half a billion dollars by 1988.

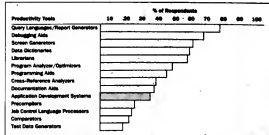
In a user survey conducted for its "IBM Software Environment" report, IDC found that approximately 28% of the 1,100 IBM sites polled use an application development system. That number correlates roughly to ACR's research, which indicates that nearly 35% of the shops studied use an application development system (see chart page 22).

"I think it is interesting to take note of how many shops are using these products," Staelin said. "There is not yet an accepted technology. It

is clearly still in the adoption phase."

Despite the growing number of application development systems offered, users often face a very narrow range of options in adopting the technology. "Users don't have as wide a choice as it may appear, in the sense that the products are very environment-specific," said Ann Morley, senior software consultant for IDC. "If you are in a DBMS environment, you are pretty much confined to a product that supports the data types you have. There are more options available than last year, but users still face some real limitations of choice."

According to Morley, vendors are beginning to provide more general, less environment-specific tools as the application development technology gains user acceptance. But even as



Use of productivity tools

ACR SURVEY

the products make inroads into DP shops, vendors must be cautious in targeting potential users.

Earlier this year (CW, March 12),

Analysts International Corp. in Edina, Minn., pulled its Corvet application generator out of beta testing mainly because the company had failed to identify the final audience for the product. "We found," a spokesman said, "that although users were influencing the sales cycle, it was programmer/analysts... who would use it. That was unexpected." Corvet was intended to enable non-programmers to develop production applications.

As professional programmer tools, perhaps the single biggest reason application development systems are brought in-house is to improve productivity. Some products boast 10:1 improvements over coding in conventional languages, but whether users achieve such gains is questionable.

"The actual productivity gains with these systems, as far as I can tell, have been limited to relatively small applications. I do not know what the world record is for the largest application ever generated, but I am sure it is fairly small compared with the really large applications that have been conventionally developed," said T. Capers Jones, manager

See DEVELOP page 26

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PANSOPHC from page 18

Also, we developed a corporatewide human resource system that maintains information on all employees. The product is definitely useful for constructing large-scale business applications," Mongell said.

About 20% of Hancock's approximately 450 applications programmers use Telon, although Mongell said the percentage of Telon users grows constantly. Hancock has used the application development system for nearly three years.

"Certain types of systems can be developed under Telon, but it is not a panacea," he said. "It is a simple on-line system that allows you to isolate complex processing. It has taken a lot of the detail work out of coding, and it allows you to concentrate more on design. But intricate, complex systems are not so suited to development with Telon."

Both Jones and Mongell said their shops faced no resistance from programmers when the products were acquired, although many experts said programmer rejection of productivity tools is a common problem (see story page 23). And, as both Amasa Refrigeration and John Hancock, development management encourages the use of the development systems.

"We have a general policy here," Jones said. "Any native [IBM] CICS program will be written with Gener/OL unless someone can prove a very good reason why it should not be."

NEWS

Prototyping: Does use match investment?

Using an application development system to prototype new applications — allowing analysts and programmers to work more closely with end users — is often one of the most important reasons an organization invests the considerable time and money needed to implement such a system. But to what extent are development systems being used for prototyping?

"Prototyping is probably one of the most common uses of application development systems today," said T. Capers Jones III, manager of the application management practice at Nolan, Norton & Co. "I also think it is one of the more important reasons for having one. The ability to do high-speed prototyping, even if that is all it does, usually makes the product valuable."



But Roger Phillips, president of Iconics, Inc., disagreed. "I think that, in principle, the tools are good for prototyping, but the current products are not really supporting that. They help you write code faster, but it still takes quite a long time to design an application. They do not really provide for the rapid prototyping necessary during development."

And, said Thomas O'Flaherty, principal consultant for the market research firm Input, Inc., whether or not a development organization prototypes has little to do with the ownership of an application development system. "The value of prototyping lies along an independent path from the value of an application development system." Prototyping has more to do with your design approach. [It] is more a state of mind; it is not tied to an application generator."

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NEWS

Vendors discuss large-scale applications development,

In an effort to address the issues of operative efficiency and the usefulness of a particular application development system for production environment applications, Computerworld asked each vendor to respond to the following questions.

1). Do you recommend your product for the development of large-scale, transaction-oriented applications?

Applied Data Research, Inc.

Model

"Model is a functional replacement for Cobol. There is virtually nothing you can develop in Cobol that you cannot also develop with Model."

Cheson Systems, Inc.

Model

"The major problem in transaction-oriented applications is I/O, and Model handles data movement quite well. Our customers at nearly 2,000 sites worldwide are using Model to develop just such applications."

Cullinet Software, Inc.

Application Development System/On-Line (ADS/OL)

"ADS/OL automatically generates pseudo-conversational, fully resistant and fully compiled code that is ideal for a production environment."

Hegen Systems, Inc.

Unidrive

"Unidrive is the technology that we [Hegen Systems] used to develop all of our banking industry applications, some of which involve more than 600,000 lines of code. Each of these banking systems is a heavy transaction-oriented application."

IBM

IMS Application Development Facility II (IMSAF II)

"IMSAF II is recommended for most [IBM] IMS/VS applications. User experience indicates that IMSAFC II can support a majority of applications in the typical IMS/VS installation." (product literature)

Development Management System/CICS/VS (DMS/CICS/VS)

"DMS/CICS/VS is an advanced application generator designed to improve productivity in the implementation of [IBM] CICS/VS applications. [It] can be used to develop on-line, interactive applications where terminal operators interact with files or data bases." (product literature)

Informatica General Corp.

Mark V

"Mark V automates all the access and allows you to go easily from one transaction to another with a simple building block approach. Our users' experience indicates that you can develop applications designed for heavy duty transaction volumes with Mark V."

Leading Software Technologies Corp.

The Intelligent Assistant

"The Intelligent Assistant was designed for the development of just such applications. In addition, CPU resource consumption during the generation process is almost negligible. The product can generate a system involving 50,000 lines of code and documentation in less than a CPU second."

McCormack & Dodge Corp.

Milliken Systems

Development Tool (M-SDT)

"All of our [McCormack & Dodge] financial applications were developed with M-SDT. So, clearly the product is useful for developing heavy production applications."

Multiphase, Inc.

Accolade

"We [Multiphase] used Accolade to develop our equipment image [on-line] entry and report generator system. Accolade is

very efficient, and it significantly decreases the time required to implement a secure, reliable and efficient user-oriented application under [IBM] CICS." (vendor spokesman and product literature)

Nasdaq Computer Software Co.

Hibel

"Any time savings during application development is critical. Thus, as a tool for productivity, Hibel is definitely applicable to the development of large-scale applications. If Hibel does not generate 100% of the code needed, the user must only insert whatever unique logic is required."

Oxford Software Corp.

LFO

"We have users running LFO-generated applications involving up to 400,000 transactions a day. I think on that basis we can re-

commend LFO for the development of production applications."

Panaphis Systems, Inc.

Generol

"Generol can be used for anything that you would normally develop with command-level Cobol. In dealing with our users, we have never encountered any problems with the development of large-scale applications."

Talon

"The performance of a Talon-generated application will be as good or better than a hand-coded system. Talon produces good-quality applications for a production environment. Our customers have developed numerous high-volume [IBM] IMS/CICS applications under Talon."

Sage Systems, Inc.

Application Productivity System/VSII (APS/VSII)

"The more complex the application, the more applicable our product is to the development of that application. Our product can leverage the skills of senior project leaders in areas such as building reusable code segments and program skeletons and allowing them to utilize fully the [IBM] IMS/VSII environment without a great deal of training."

Software AG of North America, Inc.

Natural

"We have users of our product who have developed applications that involve an extremely high number of data base calls daily. Some [development] stages have completely obviated the use of Cobol in favor of Natural."

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NEWS

rate their products against Cobol-developed packages

Q. How would you rate the efficiency of an application developed with your product to a similar application developed in Cobol by a programmer?

Applied Data Research, Inc.
Midwest

"Whenever you look at a high-level language, one of the considerations is efficiency. Cobol runs slower than assembly, but productivity during development is greater. Intel is more productive than Cobol because it is a higher level language. Intel may run slower than Cobol, but that loss is offset by the efficiency of the underlying (ADP/Date-com/DS) data base environment."

Cincom Systems, Inc.
Midwest

"It's a match-up. Merits uses fewer CPU

cycles, but the I/O is a little higher. Merits has outperformed similar applications in some cases and has not performed as well in others. Generally, it is a one-to-one comparison. In a large network, with a large number of users, you will see a difference in the sense that the Merits application will require more resources. But we feel that the increase in productivity during development offsets that."

Cullinet Software, Inc.
ADSO

"The ADSO application would be comparable in resource usage efficiency, in some situations it is more efficient and in others it would be less. It is designed for multiuser applications, so in that environment it is very efficient. In a one-on-one, transaction-by-transaction comparison, a Cobol program may be more efficient. With ADSO, there is a lot of overhead involved for just one user. But as

you add users, the additional overhead, compared to a Cobol program, is minimal."

Hugin Systems, Inc.
Understate

"Our clients have found between zero and a less-than 4% increase in overhead, if the increase has been more than that, we have been able to help the user streamline that problem instead — we find in those situations that they are usually doing something wrong. That is for a total application system. Individual programs are as efficient as the user writes them."

IBM

Vendor not available for comment.

Informatics General Corp.
Mark V

"It is a one-to-one situation, a Mark V

application would be comparable in terms of execution time, the two programs would be equal. For some programs, the statistics have shown that CPU cycles would be similar to a hard-coded system. It depends on the type of program under development."

Leading Software Technologies Corp.
The Intelligent Assistant (TIA)

"A TIA-generated system will consume fewer resources to accomplish the same amount of work compared to a handwritten system. Depending on the application, the user should expect an improvement in resource usage efficiency in the range of 10% to 30%."

McCorrumb & Dodge Corp.
MS07

"The product is essentially as efficient as running Cobol."

Multiplications, Inc.
Acculude

"We have undertaken studies in this area. If you talk about an average program, we are identical. The average programmer doesn't do things as efficiently as possible. We estimate that a highly skilled programmer would write a program more efficiently by about 10%. But for an average program, we are about dead even."

Niederl Computer Software Co.
Nilad

"The difference would be very minute. Nilad generates only the code you request, it does not utilize a program editor. The difference in machine requirements would be unpredictable compared to a handwritten program."

Oxford Software Corp.
LFO

"Any comparison such as this would vary with the complexity of the application being developed. On the average, however, a LFO program would utilize anywhere from 1.2 to 1.5 times the resources that an average Cobol program would."

Parascript Systems, Inc.
Genera/OL

"A program developed with Genera/OL would be comparable in efficiency to a program developed in command-level (BASIC) COBOL. However, a Genera/OL program does not require a compile or table changes and additions."

Talon

"The flexibility of the product and its use of Cobol and PL/I allows for performance as good as any hand-developed application. We have had comments from customers that their Talon-developed applications are the best in their shops in terms of performance monitoring. As with any application, an expert could come in and do a better job, but performance using Talon will be as good or better than with an average handwritten program."

Sage Systems, Inc.
APS/BSB

In benchmarks conducted during Times Instruments, Inc.'s product evaluation (of application development systems), results showed that APS/BSB-generated code was virtually identical in efficiency to handwritten code."

Software AG of North America, Inc.
Method

"[Use of the product] is going to do you something. You have to pay for the productivity gains you achieve during development. There may be up to 20% added CPU utilization, but you will get a 20% to 25% increase in productivity during development."

programming.

While doing research for their recent book, James Martin and Carme McGhee reviewed action diagramming techniques and came to one overwhelming conclusion:

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"Diagramming Techniques for Analysis and Programmers"
Prentice-Hall, 1984

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DEVELOP from page 22

of the application management practice at Nolan, Norton & Co. a consulting firm in Lexington, Mass.

"According to research we have undertaken, developers on some application systems projects realized great productivity gains. But programmers on others didn't achieve similar increases. The projects that did not exhibit those gains seemed to be those where the developers did not understand how the [application development system] product worked or where they tried to undertake things that were too complex for the system," said Robert Mongell, a senior technical programmer in the Technical Services Division of Boston-based John Hancock Mutual Life Insurance Co., which uses Pansophic Systems, Inc.'s Telon system.



the greatest strength of the products to be the increased programmer productivity they realized. But, according to Merlyn, the emphasis on improved productivity may be misguided.

INDEPENDENT PROGRAM DESIGN/DEVELOPMENT SOFTWARE MARKET PROJECTIONS 1982-1988 (U.S. vendors, worldwide) (Dollar amounts in millions)

System size	1982	%	1983	%	1984	%	1985	%	1986	%	1987	%	1988	%
Large-scale	\$ 57	46	\$ 83	52	\$125	47	\$185	45			\$ 389	39		
Mid-scale	\$ 58	79	\$121	64	\$168	57	\$311	60			\$ 785	51		
Micros	\$ 3	120	\$ 11	136	\$ 25	80	\$ 49	73			\$ 144	54		
Totals	\$118		\$215	63	\$398	60	\$545	66			\$1,318	48		

IDC-OWT

tion of Boston-based John Hancock Mutual Life Insurance Co., which uses Pansophic Systems, Inc.'s Telon system.

In a recent survey of sites using application development systems, IDC's Information Systems Planning Service found that users perceived

the greatest strength of the products to be the increased programmer productivity they realized. But, according to Merlyn, the emphasis on improved productivity may be misguided.

"What problem are you really trying to solve? Programmer productivity is a very difficult thing to understand. The focus should be on application development productivity, not just programmer productivity. The time it takes to code in Cobol gets people searching for tools or higher level languages. But coding is only a minor phase in the development life cycle. Increased programmer productivity only means that we can generate the wrong application 10 times faster," he said.

While many products profess to aid in the entire development process — from design to maintenance — they often support only the actual coding portion of development, a portion that may comprise as little as 5% to 10% of the cycle. Considering that most problems with applications stem from poor design, and in light of the fact that maintenance now takes up more than 50% of staff time for most organizations, many experts feel the products fail to address two of the three major problems facing in-house development shops today.

Design mistakes

"Most of the bugs in large systems come out of mistakes in requirements and design," Jones said. "You can make the same mistakes with generated code that you can with conventional code. The probability that coding errors will not be as great is not critical because coding errors are not the main contributor of bugs. It is misunderstood requirements or poor design."

Richard Foudy, vice-president of the fourth-generation language consulting firm, National Decision Systems, Inc. in Monroe, Conn., agreed with Jones. "Very little, other than intelligence, can help in the design phase. These systems cannot really help you design better. If they claim to, they can get you into real trouble. No software product can help poor design."

But according to Prensinger, the disciplined, structured methods some products impose on developers can improve application design and quality. "These tools can enforce structured, standardized techniques on programmers. That forces the creation of a maintainable product."

"A real problem with the current generation of application development products is that they don't really address maintenance. While you can generate applications more quickly, in the end, you are faced

See DEVELOP page 32

From



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NEWS

Personnel costs make development tools worthwhile

By John Gallant
CW Staff

One of the weightiest charges leveled against application development systems is that the applications they produce are inefficient resource hogs—a claim most vendors deny. With personnel costs rising and hardware costs dropping, however, some insiders said the point may be moot.

"You generally give up some efficiency with these tools," said Thomas O'Flaherty, principal consultant with the market research firm Input, Inc. "But that should not be a primary concern with hardware costs falling compared to people costs. The benefit is good quality systems produced much more quickly."

But the performance vs. productivity trade-off may not be quite that simple, said Steven Pfenzeninger, president of IMS Consulting, Inc.

"People used to say 'Oh, we'll just add another CPU.' But performance is back as a solid issue. A lot of products that fit into this category have to be doing something pretty inefficient to perform their magic. It won't be long before people see that the costs are just too heavy to pay for this magic."

People costs rising

Vaughan Merlyn, vice-president and general manager of the systems software division of Walker Interactive Products, Inc., echoed Pfenzeninger. "Everyone acknowledges that hardware costs are falling and people costs are rising. They say that applications on time and on budget justify additional machine requirements. But when it comes time to buy additional horsepower, people start asking questions and hedge about making purchases. There are a lot of response-critical applications, where throwing hardware at the problem would not alleviate the performance constraints."

Performance problems and other complaints lead many to question whether today's application development systems are useful for the entire range of applications that a business needs to develop. Vendors of the systems certainly claim they are, but not everyone agrees.

"I think the products are applicable for classic, host-based applications," O'Flaherty said. "Vendors like [McCormack & Dodge Corp.], [Cullinet Software, Inc.] and [Hogan Systems, Inc.] have been using their products internally for years to develop applications for their customers. I see no reason why they cannot make the claim that the products are useful for developing traditional

business applications."

But Jones said the application development systems



may be better suited for smaller, peripheral applications rather than high-volume, transaction-oriented

systems. "The performance

of both application and program generators, on [the] average, is not up to customized coding. But for many applications, that does not even matter," he said. "Short-lived applications traditionally use more computer cycles during compilation than they do in execution mode during their whole lives. They pay for themselves with shorter

development. But for high-volume production applications, the high use of [millions of instructions per second] and the slow response time of generated applications make them a less optimal choice."

Everyone, though, seems to agree that application development systems are becoming less environment-

specific, more powerful and flexible and more attuned to application performance. They are also seen as becoming something of a necessity for cost- and quality-conscious development shops.

"Eventually," Merlyn said, "all applications will be developed with some or many forms of application development technology."



NEWS

Microcomputer helps artificial heart keep its beat

By John Diamond
CW Staff

LOUISVILLE, Ky. — The mechanical heartbeat of William J. Schroeder, the 62-year-old artificial heart recipient at Humana Heart Institute here, has been monitored since the heart began its work with the help of a microcomputer from Compaq Computer Corp.

Computer technology from Hewlett-Packard Co. and Apple Computer, Inc. also played a role in the Nov. 28 operation, which was the second artificial heart implant ever performed.

According to Brent Mays, the assistant technical director at Humana, the Compaq micro sits atop the 323-lb, refrigerator-size unit that

drives the artificial heart. "What we process with the Compaq is the air exhausted from the artificial heart," Mays said.

Electric signals measured

HP transducers in the artificial heart system convert air pulses, generated through air lines connected to the patient, to electrical signals

that the Compaq can measure. "The signals tell us the rate of airflow exiting the heart as the heart fills with blood before the next beat," Mays said.

The Compaq, calibrated to the volume of air that should be present, multiplies the air volume by the heart rate to yield a cardiac output, a standard physiological measurement.

The Compaq produces a flow curve of cardiac output based on every second or third beat of the artificial heart, Mays said.

Mays, who was present in the operating room during the 6½-hour operation, along with Humana technical director Larry Hastings and the medical team, estimated that the artificial heart drive would have to stay connected to Schroeder for approximately a month. But a portable drive weighing only 11 pounds may be substituted if Schroeder's recovery progresses.

Three days after the operation, the outlook was optimistic. One of Schroeder's doctors said he was amazed by his patient's progress.

Chosen for portability

The Compaq was chosen for its portability in the operating room and for its IBM compatibility, since Humana uses an IBM Personal Computer AT for data storage, Mays said.

"The micro made the operation more practical because it gives us a noninvasive measure of blood pumped," Mays said, meaning the measure can be taken without inserting a separate catheter into the patient.

Software for the Compaq was developed by Symbion, Inc. of Salt Lake City, developers of the artificial heart. Laurence Bennett, artificial heart project manager at Symbion, said the software was written on an Apple IIe, but the Compaq was considered more convenient for the operating room.

Micro a needed diagnostic tool

Bennett described the microcomputer's role in the operation as "the thermometer of the artificial heart. It's a needed diagnostic tool."

HP had several products involved in the operation, including its Monitor terminal, Data Management Module, Universal Quartz Pressure Transducers, Patient Information Center, Pressure Modules and a hard-copy printer, according to HP spokesman Scott Marber. "Basically, what this instrumentation does is monitor vital signs," including the pulse rate, blood pressure and calculations on the pumping efficiency of the heart, he said.

"What's interesting is that the artificial heart does not give off electrical signals like the human heart, so we're not taking electrocardiograms," normally used to measure heart abnormalities. The HP instruments, when not being used in artificial heart implants, are used in hospital coronary care and intensive care units, Marber said.

N C R

N C R

NEWS

Medicaid system recovering from painful conversion

By Dennis Raines
CW Staff

ATLANTA — The State of Georgia overwhelmed its Medicaid payments system — leaving medical service suppliers unpaid, paid doubly or rejected for payment — as officials here learned the hard way that conversions should be kept as simple as possible.

When the expenses incurred by Georgia's Department of Medical Assistance (DMA) in processing Medicaid claims climbed too high and provided too little management information, the state decided that contracting the work out could save money, said Cal Calhoun of the Georgia Hospital Association. Georgia enlisted the

Computer Co. of Richmond, Va. to develop and run the state's \$650-million-a-year Medicaid program, he said.

Within four months of the new system's implementation, approximately 10 thousand eligible recipients were categorized as ineligible, communications breakdowns prevented hospitals from receiving clearances on eligibil-

ity and some categories previously kicked out of the old system for manual review — such as one-day hospital stays — were just plain kicked out, said Calhoun.

Routine management reports from the system were useless because of inaccuracies, Calhoun said. As of the first week in November, \$20 million in back payments had

stacked up, he said, and \$6 million had been erroneously paid out.

Dale Groenenboom, director of patient financial services at the Medical College of Georgia hospital, said "We had a few thousand claims that we rushed to get in by June 15, and we thought the DMA would process them." The claims were submitted on forms using the old (UB16) federal reporting requirements, because the new (UB82) requirements did not become mandatory until July 1, he said. When the claims using UB16 were actually entered into the new system, they were rejected. "My impression was that all we submitted to DMA would be on the regular old program, and all that we would submit to the Computer Co. would have to be on UB82 forms. Some of the problems were

We decided to convert and make changes in the old system... we should have changed the old system as it stood and then converted.

—Aaron Johnson, Commissioner of Georgia's Department of Medical Assistance

the result of faulty software, Calhoun said, and others were related to providers' methods of filling out forms.

The state formerly had two systems that processed Medicaid claims: Paris, which stored eligibility information, and the Medicaid system, which picked out the recipients to pay, DMA Commissioner Aaron Johnson said.

There were files in Paris that did not exactly correspond with the Medicaid system files, he said. "When we converted, since the Medicaid system would not be needed for determining eligibility, we had to reconcile the two files and the two were out of sync," he said.

"We decided to convert and make changes in the old system at the same time. We should have changed the old system as it stood and then converted," Johnson said.

The Computer Co. was not responsible for the problems, according to Johnson. It was Georgia's poor conversion that caused the mess, Johnson said.

The company has sent all available staff to Georgia to clear up the glitches, and Johnson thinks it is "100% straightened out" as of the last week in November.

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NEWS

Medicaid system saves Massachusetts \$56 million

By Dennis Raines
CW Staff

BOSTON — Computerized payments topped \$56 million off the commonwealth of Massachusetts' \$1.2 billion worth of Medicaid payments in the past year.

Until October 1983, the state's Medicaid payments were processed manually — some out of shoe boxes in the overflowing files at the commonwealth Public Welfare Department's office here, a department spokesman said. The average payment time was 45 days, said Gene DeLucia, assistant to systems to the commissioner of the welfare agency. According to the agency, Massachusetts was the last state to computerize Medicaid payments.

The system processed 17 million Medicaid claims for hospitals, nursing homes, physicians, pharmacies and other medical services in the past year and completed 95% of the claims within 21 days, DeLucia said.

The Medicaid Management Information System (MMIS), designed and operated by Systems Development Corp. (SDC) of Somerville, Mass., comprises two IBM 4841 Model Group 2 machines running under IBM's OS and VS operating systems, DeLucia said. SDC receives, enters and processes all claims under its contract as fiscal agent for the welfare department.

On-line inquiry

Terminals in the main office allow for on-line inquiry by the department's staff. IBM's IMS data base controls recipient eligibility data, with all other data stored in Vsam files, he added. The system sends each claim through a series of more than 100 checks to detect incorrect or fraudulent claims. Because of MMIS, Massachusetts Medicaid expenditures rose only 3% this year, compared with an average of 10% for each of the previous five years and a 6% national growth rate last year, the welfare department said.

Information entered into the new system enables the MMIS to identify clients who have private insurance or other agencies responsible for payment, said Lee Chelminiak, director of communications for the common-

wealth. This ensures that Medicaid is the payer of last resort, she said. Other large savings have resulted from a decrease in overbilling or duplicate billing, Chelminiak said. For example, the system rejects a chest X-ray charge on a bill for a broken finger, which gets charged manually, she said. The same is true for "gang visits," where a doctor might examine all four of the children a mother has with her on a visit for one sick child, she said. The system keeps records that show if a particular physician has a long record of such visits or if there is a valid reason for such treatment.

SDC designed two subsystems specifically for management information,

DeLucia said. The Management and Administration Reporting Subsystem includes operations reports and financial information, and the Surveillance and Utilization Reporting Subsystem provides recipient profiles, utilization patterns, practice patterns by provider category and diagnosis-related patterns.

"We implemented UB82 [federal claims reporting requirements] right from the beginning," DeLucia said. The welfare department also changed dental and other reporting codes and ran intensive one-day training sessions for providers on a regular quarterly basis to ease providers into the new system, he said.

The biggest source of grief in im-

plementing the MMIS has been related to Medicare/Medicaid crossover claims, DeLucia said. Medicare pays 80% of the bills of the eligible elderly, with Medicaid picking up the co-insurance and deductible portion (20% minus a \$90 quarterly deductible). Miscommunication among the welfare department, SDC and Blue Cross/Blue Shield — the fiscal intermediary for Medicare — led to confusion about format and edits that apply to that data, he said. That problem has finally been resolved, DeLucia said.

The state expects to save another \$36 million next year and \$153 million by the end of fiscal 1986, the welfare department said.

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NEWS

DP link next step in decision-support system growth

CHICAGO — The next growth step for decision-support systems will be a linkup with data processing, as the border between the two groups breaks down, according to a decision-support systems (DSS) specialist.

DSS and DP drifted apart throughout the 1970s, with DSS emphasizing user control and adaptive designs and DP focusing on architectures and large-scale projects, according to Peter G.W. Keen, Ph.D. and chairman of London-based Information Technology, Inc., during a speech here last month at the Worldwide Users Conference of the Evaluation and Planning Systems, Inc. (EPS) Users Group International.

Keen said DSS once was a warning

signal to DP that the world was changing and that today, artificial intelligence provides the same warning to DSS.

"Those of us involved in the [DSS] field viewed DP as a sort of inferior form of blue-collar worker," Keen said, adding that such an attitude was inexcusable. "That split has taken a long time to fuse, and now what's coming through is that, surely, DP needs DSS as badly as DSS needs DP," he said.

Flood of new technologies soon

Keen predicted a flood of new technologies, presenting opportunities to apply decision-support methods to expert systems. "It's going to

be the DSS people who build expert systems that work," he said, noting that the next two years will see DSS attacking the question of what being an expert manager means.

DSS software has been underexploited, partially because development has focused on small applications that react to immediate needs rather than to people building career paths and mandates, Keen said.

"DSS is in danger of getting blurred with end-user computing," he noted. "We've got to get away from personal computing and look at organizational computing, organizational productivity and organizational decision making. DSS should be a key part of the overall computing re-

source," he added.

'Use of technology to improve creativity'

"The old definition of DSS has always been to take any available and suitable technology and use it to help improve managerial decision making. I suggest that DSS is about the use of any technology — analytical, financial and computer — to help improve creativity in decisions that really matter."

Keen urged the 200 conference attendees to find a better target market. "Who are the people in your organization you would really like to influence?" he asked. "The next opportunity is to start thinking of DSS as a new style of corporate thinking and planning. That's what DSS is really about; [it's] a service, not a product."

He said the keys for DSS software were integrability; architecture — a blueprint for gradually integrating DSS, MIS and office technology; shareability of processes and data; communications connectivity; and transportability, as applications are moved into new operating environments.

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DEVELOP from page 26

with the same maintenance requirements as with a hand-coded system. Maintenance remains tedious and error-riddled," Roger Phillips said. Phillips is president of Iconics, Inc., a Scottsdale, Ariz.-based firm that manufactures the Transform application development system.

However, according to IDC's Staelin, the application prototyping abilities that the products impart to users aid in design by involving users in an iterative relationship with analysts and programmers (see story page 25). In addition, the automatically generated documentation that many such products provide facilitates maintenance, she said.

"Many of these things completely automate documentation, which is the keystone of maintenance," Staelin said. "The products also enforce modularity, which simplifies subsequent maintenance. They allow users to use tried and true code [reusable code blocks or segments] that a programmer would have to rewrite, with the possibility for errors, for each application."

"Even if the application generated initially meets user needs," Meryn said, "it won't for long. There are no static applications. Needs change. Programmer productivity is not the problem, application architecture is. We need to change the way we develop systems. Today, applications are produced like cars with the spark plugs welded into the engine block. Any future change means complete reworking of the system. What we need are tools for earlier in the development life cycle that will help us in designing systems that can be adapted to changing requirements in the future."



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China looks to high-tech future

LONDON — China is a land of computer contradictions and extraordinary computing opportunities, according to Prof. C.S. Tang, one of that nation's most prestigious computer experts.

Speaking to the London branch of the British Computer Society recently, Tang announced that all of China's universities have been given

permission to buy large computer systems in order to establish computer centers and promote computer literacy there.

"The universities are providing a unique marketing opportunity, opening the doors to something like 300 or 350 sites," remarked Tang, as he cautioned his audience that this presented a

chance the UK cannot afford to miss.

Tang gave many examples of the existing cooperation between the UK and China, which serves as the foundation for a link between the two countries. He also noted that the UK's University of Edinburgh — alleged to have more Chinese computer students than Scottish ones — is expected to play an important, role in China's plans.

Many of China's plans call for both the implementation and wide-scale domestic production of computer technology, Tang continued. The majority of China's micros have been and continue to be imported, however, although a number of foreign companies have factories in specially zoned areas around Hong Kong, according to Tang.

Tang spoke highly of ICL Co.'s contribution to early Chinese computing efforts, which were, until recently, severely hampered by the country's comparative isolation.

The ICL/Chinese joint venture in many ways paved the way for other foreign vendors to work in China. "China is determined to continue building its own computers," Tang maintained, implying that joint ventures are China's hope for the future.

Major thrusts

One of the major thrusts of Chinese computing in the near future will be in the areas of Chinese character information processing, information systems, software tools, programming development environments, expert systems and logic programming, Tang said. The Japanese, equipped with a common written language with the Chinese, have the decided advantage in this marketplace, he added.

Tang also said that in the area of fifth-generation computers, it is likely that Japan will be China's main source for these machines, "partly because of proximity and partly because the Japanese Big Five — Hitachi Ltd., NEC Information Systems, Inc., Mitsubishi Electronics Corp., Fujitsu Ltd. and Okidata Corp. — have all made huge investments in Kanji character processing and voice input," he pointed out.

At the same time, U.S. Department of Trade figures indicate that China imported \$71 million worth of computers in 1981 from the U.S. and an estimated \$600 million worth of U.S. machines in 1983.

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NEWS

UK users question value of donated OA equipment

By Lisa Israel
Special to CWT

LONDON — Gordon Ross wonders whether \$300,000 worth of free computer equipment was worth all the bother. Ross, data processing consultant with the UK's Department of Trade and Industry (DTI), recently spearheaded 21 separate office automation pilot projects with donated equipment.

"If the sites had known what they were letting themselves in for, I'm not sure they would have wanted to do the pilots," he confided. "Installing the systems always turned out to be much more difficult than anticipated."

The DTI's four-year pilot scheme

got under way in 1982 and is now at the halfway mark. The initial plan was to identify the benefits of advanced integrated OA systems — the sort of systems that suppliers would be unlikely to attempt at commercial sites, Ross said. Twenty-one office automation suppliers were paired with a corresponding number of public sector users, and the results have been closely monitored over the past two years.

"Some suppliers saw the pilots as a chance to win an easy sale," said Ross, "but they have lived to regret that decision. In some instances, suppliers have been forced to learn about OA in spite of themselves."

For all the talk, Ross argued, OA is

still an untested technology, and existing equipment is not always geared to support advanced office needs.

Many of Ross' pilot users were far from satisfied. Mike Bickers, who managed the pilot that relied on Systime equipment at the National Economic Development Office, has a long list of complaints with his system, which he thinks will take ages to resolve.

"We have still a pretty basic system. We have no filing apart from personal wastepaper bins, which our users dare not empty. We have no integration at all between word processing and spreadsheet and electronic mail," he said.

Chris Whitley, who managed the British Broadcasting Corp.'s (BBC) project with equipment from Racal-Milgo, Inc., maintained that computer manufacturers have not yet faced up to the different equipment requirements of inexperienced end users. He argued that while the data processing staff might be accustomed to computer breakdowns, with office workers, Whitley said, "anything other than total reliability is a problem." Unreliability became a "big barrier" to end-user acceptance of the new technology at the BBC, Whitley said.

Digital Research, Inc.'s CP/M operating system also gave Whitley trouble because, he claimed, "it is not user-friendly," a problem that was cited by another pilot project manager, David Marshall-Wright at the Brighton Health Authority in Brighton, England.

Although Brighton was paired with Allied Business Systems, Ltd., which is a smaller company than Racal, both manufacturers had offered CP/M as part of their solution.

Marshall-Wright said, "Most large organizations still think of office automation in terms of distributing large numbers of micro and CP/M applications packages." But CP/M can create networking problems, Marshall-Wright argued. CP/M software packages are not user-friendly, and some, he said, are so complicated that they turn off end users.

Delayed releases

A large number of users also complained about delayed product releases. At the Department of Transport, Philips Information Systems, Inc.'s inability to come up with networking software upset finely tuned plans for introducing end users to information technology. By the time the intranode software to link workstations to central files appeared from Philips, users were not attached to their stand-alone floppy disk files that they were reluctant to access the central system.

British Gas had a similar experience. The utility was paired with videotex specialist Argon International under the scheme and installer, Digital Equipment Corp. VAX-based videotex software and graphics terminals from Argon at offices scattered throughout London. But several bugs in the videotex software and delays in hardware and software deliveries put off some of the users that pilot project manager Peter Ashdown was introducing to the system.

Were the pilots worth the trouble?

According to some users, the answer is a resounding "no," from a financial viewpoint. Both the Department of Transport and the BBC admitted that cost justification over the two years of the pilot project was unlikely. Spokesmen for both agencies said it would take at least three years for the savings to become apparent.

But for Ross and the DTI, the projects have not been failures. Ross said, "One could be disappointed with all the projects because of the gap between potential and reality. But the pilots have provided lessons for both users and suppliers."

Israel is a reporter at Computer News, the British affiliate of Computerworld, headquartered in London.

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NEWS



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THE NETHERLANDS

AMSTERDAM — IBM Netherlands sent letters to Dutch universities last month, offering a 40% discount on all Personal Computers. IBM invited universities here to sponsor joint purchase policies to assure maximum discounts, much to the dismay of major local

dealers, sources said. There appears to be only one catch: The universities will be responsible for installation, support and maintenance.

AMSTERDAM — Privacy legislation is still lacking here, despite a high level of public interest and activity on the subject. The Netherlands' National Alert Foundation Chairman Jan Holvast has been publicly pleading for more decentralized control over individual privacy,

which is largely controlled by the Dutch Minister of Justice's Register Chamber. Several proposals to decentralize this chamber have been offered to the Dutch parliament, but none have been acted upon to date.

ENGLAND

LONDON — Warren Werblow, chairman of the Computing Services Association, last week attacked British

government plans to license software exports along with its moratorium on grant applications for software development. "We will push and shove and battle against the encroaching bureaucracy. We need to know what the rules are, how they are generated and how they can be modified," he said. Werblow expressed specific concern over the limits on technology exports to friendly countries, as well as those imposed on Eastern bloc nations.

AUSTRALIA

ROBERT — The Island State Credit Union will beat the Commonwealth Bank to the punch with Australia's first home banking system this month, according to sources here.

The system is said to be fully operational, and its public release is only awaiting the implementation of an advertising campaign.

The credit union, which developed its banking system from scratch, will reportedly provide bank customers personal computers with such dial-up services as bank inquiry, bill payment, loan applications and other account services. Project leader Mark Ashton said the system will run on an Ultimate Corp. minicomputer under the Pick operating system from Pick and Associates, Inc.

SYDNEY — Users should demand superior solutions from vendors, and because of intense market competition, users should expect their demands to be met, said Joe Henson, president of Prime Computer, Inc., during the recent International Spectrum Pacific Conference here.

Henson maintained that users should ensure they get the systems they want, claiming that vendors must now be sensitive and responsive to users' growing, realistic concerns. "Our success lies in listening to you," he told his audience.

SYDNEY — Telecom Australia jumped on the computer bandwagon last week when it released its telephone/personal computer. The Computer Phone, which was designed in the UK by ICL and Sinclair Research Ltd., will be sold for \$2,466.

FRANCE

PARIS — CII Honeywell-Bull-Sema has introduced a range of high-end 32-bit superminicomputers called the Bull SPS 9 systems. The products represent the joint development effort of Bull and Ridge Computers, Inc. of Santa Clara, Calif.

The product is intended to handle real-time industrial applications, scientific applications, computer-aided design and interactive image processing, according to a spokesman.

The Bull SPS 9 system, which is now being produced, will feature a reduced instruction set that enables extremely high processing performance, according to




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Q What is the best way to teach integrated microcomputer or software packages? We decided to standardize on a microcomputer and on an integrated software package. In support of our decision to standardize, we held three all-morning training sessions,

each with about eight people (one to a micro). Using several predefined spreadsheet templates, we walked through two examples showing the major features of spreadsheet, word processing, data base and graphics.

A month later, the micros we purchased for the various departments, as well as those that already existed, are basically unused. The managers are blaming us for their lack of use. They contend that the material was covered too fast and

that they forgot everything they learned. We had hoped that these sessions would have given them a good start and that they would continue to learn through their own initiative. Apparently, they made no further progress. Should we encourage them to learn on their own, or should we repeat the sessions?

Contrary to advertisement, espousing the user-friendliness of integrated microcomputer software, very few people, even computer specialists, can hope to gain much proficiency in a four-hour training session. Moreover, it is unlikely that they will retain much, if what they learn is not applied shortly thereafter.

Plan to conduct another round of training sessions; however, this time, allow more time. If your objective is to present these four software elements at a useful level of depth, plan on at least 16 hours, equally divided between formal presentation and supervised practice.

As a follow-up, set up an information center so that advice and assistance are just a question away. If no help, or motivation, is available, all of the training will go for naught, and your new micros and software will continue to be unused.

Q We have been debating whether to use the "of" convention or a prefix to qualify data elements, such as "JOB-LOCK OF HISTORY-FILE" vs. "JOB-LOCK." "JOB-LOCK" could be the same in many files. Which do you prefer? Why?

Neither. Your need to qualify data elements implies the use of a traditional flat file environment and all of the costly disadvantages accompanying it. To anyone still fighting the troublesome problems that accompany a traditional file environment, I would recommend that you begin planning your conversion to an integrated data base environment — as soon as possible.



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NEWS

Coors taps telephone data system to handle growth

GOLDEN, Colo. — Coors beer once was available only to beer drinkers in the Rocky Mountains and the West. Now, the brew is distributed throughout 39 states from coast to coast, with nationwide distribution a short-term goal for Adelphi Coors Co.

Coors' products are shipped cold from a single brewery on the day of bottling. Therefore, Coors' distributor ordering system must be fast, reliable and accurate to ensure freshness as Coors expands.

When the brewer recently chose an ordering system for its distributors, it selected a telephone information processing (TIP) system developed by General Electric Information Services Co. (Geisco). The system connects the distributors with Coors headquarters here over Geisco's Mark III remote computing service.

"As we grew, we had to develop a faster ordering system. With more than 540 distributors, the old, less automated ordering systems would never be able to effectively handle the volume," said Don Van Buhler, director of physical distribution for Coors.

Coors initially collected distribu-

attached to any rotary dial telephone.

The Coors TIP system is available to the distributors 24 hours a day, seven days a week. A typical report will take from five to 10 minutes to file, Van Buhler said.

The Coors TIP system tracks weekly sales and sales forecast information as well as weekly order data. For each Coors product the individual distributor carries, the TIP system asks a series of questions about sales, inventory, new order amount and sales forecast data for several weeks in advance.

Coors distributors, who order weekly rather than monthly because of Coors' freshness policy, call in

their information on Monday or Tuesday each week. The information is stored in Geisco's host computers. Late Tuesday afternoon and again on Wednesday morning, Coors' in-house computer system picks up the information for processing.

To minimize errors, the system accepts only valid information. The computer voice tells distributors what information to enter and points out obvious errors. Each information field must be filled with the proper number of characters.

The system also automatically checks for arithmetic errors and allows distributors to compare batch totals to ensure further the accuracy of the data.

"The system works well for us because it doesn't require our distributors to purchase hardware, and it is easy for people unfamiliar with computer systems to learn to use," Van Buhler said.

Coors uses information from the system to schedule production, plan marketing and promotional efforts, track the success of advertising campaigns, project packaging and materials needs and schedule transportation.

"As we continue to expand and compete with other breweries, the level of service we provide becomes extremely important. The TIP system is part of Coors' commitment to service," Van Buhler said.

'We had to develop a faster ordering system. . . . The old systems would never be able to handle the volume.'

— Don Van Buhler, director of physical distribution for Coors.

tor order data by mail, a system that was replaced by a TWX-based system as Coors' Western distributors grew in number. When the decision was made to market Coors' products nationally, the TWX system was examined closely.

"We needed a system that the distributors would accept and like. We also wanted a system that allowed distributor personnel to input data directly, but we couldn't count on all of our distributors having suitable terminals for this purpose," Van Buhler said. Another reason to switch was cost, as TIP was more cost-effective in collecting order data.

"Geisco had considerable experience with TIP systems, and it had a suitable network operation. It offered a package that fit our needs very closely," Van Buhler recalled.

Geisco also developed the order entry software with input from Coors on its specific order entry needs.

Automated data gathering

The TIP system is an automated data gathering system that uses standard AT&T Touch-Tone telephones as input terminals. A synthesized voice from the Mark III service prompts the distributors and guides them through the order input sequence.

The distributor keys numbers into the telephone, such as identification numbers and commodity numbers, in response to user prompts. Distributors also can use an adapter

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NEWS

Manufacturing system speeds GE's shop production

SCHENECTADY, N.Y. — At the world's largest manufacturer of steam turbine generators here, an extensive program has been under way to automate manufacturing operations.

Since 1980, General Electric Co. has been installing a computer integrated manufacturing system that has significantly increased efficiency at several manufacturing shops, said Robert Schmitz, manager of manufacturing systems applications.

According to Schmitz, GE's manufacturing system consists of six Data General Corp. Eclipse MV/10000 systems and two MV/8000 systems. The systems are said to provide approximately 6.4G bytes of data storage, us-

ing mostly 190M- and 364M-byte disk systems.

Additionally, GE has six DG Eclipse S1140 systems integrated into its Calma Corp. computer-aided design and manufacturing systems.

GE manufactures replacement parts for the turbine engines, filling more than 350,000 orders for studs, bolts, packing rings and spill strips.

Part of the project consists of a Factory Management System, which has cut down on production time at several of the company's large manufacturing shops.

According to Schmitz, before GE implemented its system, job and parts information was input via punch cards and batch processed on a Honeywell, Inc. DFS 8

mainframe. "Several days to a week later you got a report back, and by that time it was out of date," he said.

With the Factory Management System, a customer's parts order is entered through a direct-order-entry system and converted on-line into an order, which is then transmitted to GE's mainframe computer.

An Automated Process Planning System running on a DG MV/10000 system receives the order from the mainframe and matches it to a Part Recognition Code. The system determines the most efficient routing of the part through the shop and selects the proper material.

At the company's Small-Parts Shop, the Factory Management Sys-

tem, residing on another MV/10000, consists of several modules: shop floor control, which monitors all phases of control between parts and operators; factory communications control; and distributed numerical control. According to Schmitz, the part is dispatched to the appropriate workstation via the shop floor control module.

When the machine tool finishes the part, the Factory Management System and then the operators enter labor working details in real time. The factory communications module then notifies an inspector that the part is awaiting inspection at a specific station, Schmitz said.

The inspector, after approving the part, enters his certification at the terminal. Factory communications then notifies the materials handler that the part is ready to be moved from one machine tool area to another or to the shipping area. When the part is shipped, appropriate information is entered into the terminals.

Eliminating punch cards

"The shop floor communications module alone boosts our productivity substantially," Schmitz said. "Volume in the Small-Parts Shop is an heavy, with more than 16,000 orders a year, that the savings are substantial. For example, we eliminated the need for 500,000 punch cards with this system."

"Another thing we can't afford is excessive queue time — the time raw material sits around before an operator can get to it."

"This system not only solves those problems, but does it without using paper. Additionally, all of the information is automatically entered into the other elements of the system, keeping our data base current and precise."

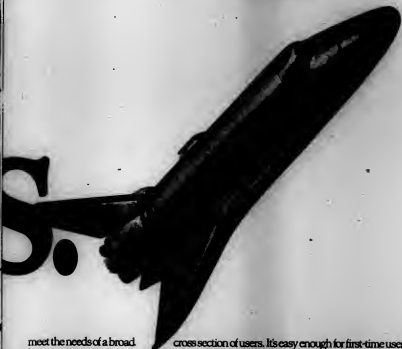
"We also use the Factory Management System for other types of communications. Should a machine tool malfunction, the operator [goes] through a menu-type display to generate a service call. The operator can also talk to his foreman [or methods, quality control or other people who] he would otherwise have to physically track down."

Parts design is another area, that the steam turbine generator business has integrated into its overall system. Engineers design parts at Calma CRT-based workstations, which are based on DG Eclipse S/140 computers. The designs are assigned a Part Recognition Code, and then they are entered into the data base.

When selecting the system, GE examined a range of minicomputer processors with the same capability, Schmitz said. To test each system, the company did "application run-offs," writing up transactions similar to those the company would use. DG performed best in the areas where GE was most interested: data base systems, data base recovery, future software and architectural upgrades and utility packages. According to Schmitz, the process took about six months.

With the system now in place in three major GE shops, the company hopes next year to begin installing it in its Rotor Generating Shop, and by 1987, to have the system installed in its Diaphragm Manufacturing Shop, Schmitz said.

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NEWS

Office automation system propels Air Force research

ARNOLD AIR FORCE STATION, Tenn. — It is often said that an army travels on its stomach. But the Arnold Engineering Development Center (AEDC), a U.S. Air Force-managed research and test facility located here, appears to travel on its office automation system.

The AEDC consists of physicists, engineers, metal-

burgists and other aerospace scientists engaged in various research projects. For instance, when the organization's Aeropropulsion Systems Test Facility is completed in 1985, AEDC will be able to subject 100,000-lb thrust jet engines to simulated subsonic and supersonic flight conditions.

In addition, the AEDC has

been involved in many aerospace programs ranging from Minuteman intercontinental ballistic missiles to the space shuttle. The organization's clients include the Air Force, the National Aeronautics and Space Administration, the U.S. Army, the U.S. Navy, private industry and other organizations.

But while AEDC's techni-

cal community wrestles with complexities such as simulating flight conditions at 1,000-mile altitudes and Mach 20 velocities or measuring temperatures of components superheated to 7,600 degrees Fahrenheit, the organization's management has been tackling communications and administrative challenges.

Each day, information

must be shared inside AEDC on budgets, project schedules, tests and instrumentation advances. The AEDC community includes 180 Air Force officers and enlisted personnel and about 1,500 contractors and 190 civil service employees. Test results and other data on 200 to 300 annual test projects must be compiled and distributed to sponsors who need fast feedback to choose among competitive designs and to proceed with product development.

However, distributing information internally and externally is complicated by AEDC's organization, noted Jack Broerman, AEDC director of management systems for the Air Force.

Collaboration

One reason the research unit's system works is the successful collaboration of the Air Force and contractors on an OA program, Broerman said. Solutions to common administrative headaches are now being implemented across the board, he added.

"As of May 1983, we had eight Ethernet communications systems in eight separate buildings," Broerman said. "These local communications networks are all interconnected by an underground 9,600 bit/sec interfabric cable that removes communications barriers from among people belonging to different organizations and located in scattered facilities."

"For example, it used to take two to three days for the model shop to mail an activity report to an administrative office three buildings away and get its revised and managed copy back," he noted. "Now, it can be sent over Ethernet, reviewed, revised and returned in about six minutes."

Broerman pointed out that the eight Ethernet networks are viewed as AEDC resources rather than organizationally independent tools. When the final Ethernet interconnections were made, the networks linked approximately a dozen Xerox Corp. 8010 workstations, 50 Xerox 860 information processing systems, 25 Xerox 820-II and 16/8 microcomputers and two optical character readers, and they shared resources such as laser printers and file servers. Broerman noted, however, that each of the eight networks can support up to 1,000 devices, and more equipment is being added.

"We started our [OA] efforts at the clerical end. Then we addressed upper management needs. Now, we're closing the gap, bringing [OA] to the middle-management level," Broerman explained.

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SOFTWARE

NEWS

Interactive system helps firm meet growth challenges

PARKERSBURG, W. Va. — Since its founding here in 1980, an equipment manufacturer for the life science industry has seen its sales steadily climb past the \$5 million mark, with sales during the current year projected to grow at about 75%. Such rapid growth, however, has not been without its problems.

As Queue Systems, Inc. has expanded its business, its management has had to face challenges in scheduling, pricing, cash flow, employee record keeping and accounting. To meet these challenges, Queue relies on an on-line computer system that provides management with access to information such as the total cost of a product's bill of materials and the ability to schedule production runs automatically to fill orders.

In 1981, the company decided to enlist the aid of a computer system to help manage its growth. Chuck McKinney, a founder and secretary-treasurer of Queue Systems, said the

capabilities — even though management recognized that no off-the-shelf software would fulfill its needs.

"We also knew it would cost us several hundred thousand dollars and take a lot of years to actually design our own software for inventory and production control and other manufacturing activities," McKinney said, noting that time and spare development funds are items that most young firms find in short supply.

McKinney said that IMCS-II software appealed to Queue Systems because it operated on-line, offered a manufacturing package and was easy to use. "It wasn't one module that interested us but the fact that all the modules worked together," he said.

"Before the system was installed, we had shortages all the time," McKinney said. "We don't today. The on-line system lets us manage our inventories far more efficiently. Given the sheer volume of orders we're filling now and the complexity of product bills of materials, it would be impossible to manage inventory [manually] and meet production schedules efficiently."

The software package's accounts payable module works together with a purchasing module to help manage cash flow for the company, which deals with more than 500 vendors.

"The software helps us pay vendors in time to get discounts and automates check writing," McKinney

said. "But, in addition, it lets us review how much is owed each vendor, the age of invoices and forward commitments for purchases in given time periods. All of this information has helped to improve cash flow."

McKinney also credited the interactive system with reducing Queue Systems' overall labor requirements. In such areas as bookkeeping and production control, he estimated that Queue Systems would need twice the number of workers it now has if it still relied on manual methods.

McKinney said the company has experienced no major problems with the system. He added, however, that the company recently had to replace a faulty NCR disk drive.

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Queue Systems, Inc.'s Shirley L. Doty works on an NCR Corp. 9300 system.

firm seriously considered an IBM system but finally selected a system from NCR Corp. "We chose [the NCR] system because we thought it was a little easier to run for our services," he recalled.

The system the company chose was NCR's IMCS-II Interactive Manufacturing Control System inventory and bill of materials software module running on an NCR 9300 computer. Today, the company runs three IMCS-II modules and other interactive modules to handle accounts payable, sales analysis, order processing, purchasing and receiving and material requirement planning.

In addition, Queue Systems has upgraded to an NCR 9800 computer system that boasts 1M byte of main memory plus 162M bytes of memory on one removable and five fixed disks. Installed in December 1983, the 9800 system supports four on-line data display terminals and a 200 line/min printer, according to McKinney.

Queue Systems employs only one part-time programmer, who was hired recently to customize reports produced by IMCS-II for company executives. The absence of a large DP department at Queue Systems is no accident, the company said. When the firm began searching for computer solutions, management sought to buy rather than build sophisticated

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NEWS

Software helps retail shoe chain step up productivity

COLUMBUS, Ohio — A retail shoe chain here has used a series of software products to reduce applications backlog, providing faster access to more information.

When the Kobacker Co., a national self-service retail shoe chain headquartered here, brought its West Coast terminals on-line under IBM's CICS, it wanted remote and local access for program development, according to William Hart, senior telecommunications analyst.

To service its 320 retail shoe stores, Kobacker employs an IBM 4381 mainframe operating under Viam and CICS, as well as two on-line automated warehouses.

In 1980, Hart selected Applied

Data Research, Inc. (ADR) software products. Today, Kobacker uses five ADR products, including ADR/Roscoe, Roscoe/Extended Time Sharing Option (Etsco), Roscoe Programming Facility, the Librarian and ADR/Look. All, he said, increased automation and monitored system performance in real-time while helping the end user become more self-reliant in working with applications development.

The central tool of Kobacker's information processing system, according to Hart, is ADR/Roscoe. Kobacker uses Roscoe Programming Facility (RPF) as an interactive procedural language, ADR/The Librarian in library control and management, Ros-

coe/Etsco as an interactive applications development tool and ADR/Look in hardware and software measurement on a real-time basis.

Kobacker chose Roscoe/Etsco in 1982 as a partial alternative to the RJE link between the IBM 4341 mainframe under VM and the company's West Coast warehouse. Hart said he wanted programmers to handle minor changes while they were on-site for user training, but this was not possible under VM.

Roscoe serves as an interactive application development system for IBM OS environments. It is said to provide immediate access to data during programming, extending the computer to the general user. Pro-

grammers at the West Coast warehouse call up Roscoe to produce reports, develop applications and generate spreadsheets.

From the start of the project, Kobacker's mainframe had been experiencing serious CPU crunched while operating under CMS. But, according to Hart, the problems disappeared when users were switched to Roscoe. "CMS was siphoning off 15% to 20% of our CPU cycles, which we recovered by shifting to Roscoe," Hart said.

In addition to the Librarian, Kobacker uses RPF, a high-level structured procedure language that can be executed interactively by the terminal user. Originally installed as a programmer productivity aid, RPF has been virtually taken over by end users, Hart said.

"We have several people in our accounting and general ledger areas who know Basic," he said. "Once they found out about RPF, they began to develop applications using RPF that many times completely took care of their requirements." Hart added, "I was also surprised that, working with only the Help function and without even manuals, the users could use RPF to write some fairly sophisticated programs." Some of the user-generated programs are over 600 lines in length, he said.

RPF can access Roscoe facilities for data entry and editing, library storage, syntax checking, job submission, output review and data set management.

Electronic spreadsheets

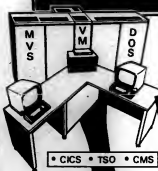
A growing requirement in almost every area of Kobacker operations is the capability to generate electronic spreadsheets for trial balances, but the process under CMS and APL was inefficient, Hart recalled. "We could support three or four APL users without problem," he said, "but when we put the fifth user on, everyone came to a screeching halt."

Not wanting to put IBM's TSO on the system because of its high overhead, Kobacker installed Roscoe/ETSO. Terminal users can now execute interactive applications under Roscoe. Hart also selected a packaged electronic spreadsheet that runs under TSO as well as Roscoe/Etsco. The spreadsheet capability has become one of the most widely used applications. Roscoe has a single address space, and as a result, other Roscoe users do not suffer poor response time, even when CPU-intensive tasks are being run. Data response time has actually improved, Hart said.

With multiple jobs contending for shared resources, Kobacker selected ADR/Look, a performance management tool, to keep tabs on system operation. Look offered the information systems manager a combination of real-time displays, exception reporting, historical reports and statistical summaries. "The information Look collected was used to justify our ordering the IBM 4381," Hart said. By having accurate statistics on hardware utilization, Kobacker avoided upgrading its CPU.

Look supplements RMF, an IBM performance monitoring tool, but takes a more active role. "Look does a better job of displaying visual graphics and indicating trends than RMF," he said.

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NEWS

DPMA chooses president

ANAHEIM, Calif. — Eddie M. Ashmore, director of information resources management at Southern Baptist Theological Seminary, was elected International president of the Data Processing Management Association (DPMA) during the association's recent annual business meeting.

Ashmore, the 33rd international president of DPMA, succeeds Carroll L. Lewis, the 1984 president and founder of Commercial Data Sys-

tems, Inc.

Ashmore has worked with the Louisville, Ky.-based seminary for 10 years and manages that institution's information resources, including data processing, word processing, telephone services, postal services, printing and duplication.

The DPMA business meeting preceded DPMA Anaheim '84, the 47,000-member association's annual computer conference and business exposition.

Systems management meeting set for April 21-24 in Nashville

NASHVILLE — The Association for Systems Management (ASM) will hold its 1986 annual conference April 21-24 at the Opryland Hotel here.

The conference will feature a two-day miniconference on managing information centers, a full-day program on communication skills and a one-day seminar entitled "Executive Support Systems."

The conference will also include a pair of study tracks titled "Managing Interpersonal Relationships" and "Integrating Systems Technologies

— 1985."

Registrants can structure their own educational paths from seminars on office productivity, systems techniques, information resource management and personal development.

Cost of the program is \$475 for ASM members and \$575 for nonmembers.

More information is available from ASM International, which is located at 24567 Bagley Road, Cleveland, Ohio 44139.

Firm hits happy medium with electronic printer

SEATTLE — For a consulting actuary, the clarity of a printed page is an important aspect of business strategy.

The product of Millman and Robertson, Inc., an actuarial consulting firm here, is information based on complex mathematical data and projections, said Marty McCune, data processing manager for M & R Services. M & R Services was formed in 1966 to provide computer services for Millman and Robertson's national network of 18 offices, as well as to service outside clients, McCune said. M & R Services also develops and sells software for life insurance companies to use in their own DP operations, he said.

"Anything we can do to improve [continually] the quality of our hard-copy output is to our advantage," McCune explained. "And page printing — 8 1/2 by 11 in. — offers a look that's superior to continuous form," McCune said.

McCune's problem during his year-and-a-half search for an appropriate page printer was to find one with a capacity of 200,000 pages per month, he said. He was stepping up in quality by replacing his 1,000 line per minute impact printer with a nonimpact printer, and he also needed a step up in volume, he added.

"The laser xerography printers,

geared for 50,000 pages per month output, were too slow, while the next level in volume offered by that printer technology was a system geared for 500,000 pages per month. The higher volume printer was not a practical expense for us. We needed a system geared for our middle range in volume," McCune said.

McCune found his solution in an alternative technology — ion deposition electronic page printers, he said. The Mercurion 1 from Southern Systems, Inc. of Clearwater, Fla. offered 60 page per minute electronic output at a purchase price under \$70,000, he said. The printer gave the company the 8 1/2 by 11-in. format it wanted and a price within its budget.

There were other advantages beyond the printout quality that was McCune's primary goal — direct connection and plug compatibility with the company's IBM 370/148 system were chief among those, McCune said. "Mercurion 1 directly attaches to the multiplex channel on our IBM and looks like an [IBM 3203 Model B] impact printer," McCune said. "In contrast, the xerographic machines required a communications link that would have restricted us to 9,600 bit/sec," he added.

The small physical size of the printer was a secondary benefit, McCune said.

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NEWS

Software gives scientist crystal ball to weather events

VICKSBURG, Miss. — Back in 1906, a violent storm striking the California coast was reported on a wire service. If the account had been accurate, the storm would have been a true meteorological anomaly — one of those phenomena that scientists might expect to see once in a century. On the other hand, the wire report could have been swept away in an attempt to re-create the storm's violence for newspaper readers around the country.

About 80 years later, an electric power utility was building a nuclear power plant in the area once devastated by the big storm. The firm planned to construct a breakwater to protect the facility, but needed to

know the historic storm's magnitude to design a marine structure strong enough to withstand similar weather conditions. So how bad was the storm?

Donald Resio, president of Offshore & Coastal Technologies, Inc. here, solved this problem by developing a software model to post-analyze the 1905 storm. Resio now conducts postanalyses as well as meteorological and oceanographic forecasts for a wide range of customers, including shipbuilders, offshore structure manufacturers, oil rig operators, marine construction companies and government agencies. With a high degree of accuracy, Resio's software predicts marine variables like wave di-

mensions, coastal flooding, storm surges and coastal currents for his clients.

Resio calls Offshore & Coastal Technologies a "numerical modeling company" whose computer-based measurements produce results that are as valid as data gathered by field instruments. Resio's software, housed in a Boeing Computer Services Co. data center in Bellevue, Wash., has an advantage over meteorological measurement devices: It doesn't sink to the bottom of the sea or get blown away like traditional field equipment, Resio pointed out.

"We have found over the years that we can predict weather about as well as other companies can measure

it," Resio said.

Resio holds a doctoral degree in earth sciences from the University of Virginia, and his area of expertise is environmental fluid dynamics. His interest in the interplay between the elements eventually led him to challenge the conventional wisdom of wave modeling.

"I really thought all the answers in wave modeling had been published in the Miles-Phillips Theory. And I wasn't alone — that was the prevailing view in oceanography," he recalled.

Resio's assumption changed when he began running a numerical code he had developed for a problem involving the Great Lakes. "The Miles-Phillips Theory didn't work. And at the time, I thought the theory was correct and my numerical code was wrong," Resio confided.

During the year that followed, Resio worked on developing a wave model that applied to "anything from a mud puddle to the Pacific Ocean."

To solve the equation for particular meteorological or oceanographical events, Resio used a variety of computing tools. For every case, "the

'All the technology we use is simply a numerical tool for getting a very specific answer at a competitive price.'

— Donald Resio, president of Offshore & Coastal Technologies, Inc.

winds act as a wildcard, determining the character of the event. Wave generation is pretty much a matter of how much energy comes into the wave field from the wind," Resio maintained.

Resio uses small models to determine wind fields. These software programs can run in 10 seconds on Offshore & Coastal Technologies' C-10 System One computer from Cromemco, Inc.

The more sophisticated Offshore & Coastal Technologies models, such as those involving wave behavior and coastal currents requiring large amounts of storage, run on a Cray Research, Inc. Cray-Y8 supercomputer at Boeing's data center. Resio optimized his code for the big machine, enabling the Cray to process an entire day's global predictions in 20 seconds. This computing efficiency means extremely competitive rates for Offshore & Coastal Technologies' clients, Resio added.

"Our customers want a certain product: They want to know how high the waves are going to run up their structures or if they're going to get inundated up on the working deck of an oil rig or the chances of waves damaging their ships. All the technology we use is simply a numerical tool for getting a very specific answer at a competitive price."

What about that big blow back in 1905? "Nothing special," according to Resio. It turned out to be a very typical Pacific storm, re-created 80 years later by a businessman in Vicksburg, Miss.

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NEWS

Package addresses credit union's financial modeling needs

WASHINGTON, D.C. — The Pentagon Federal Credit Union is in the business of serving the people in uniform who serve the U.S. But Pentagon Federal needed software to serve the financial modeling requirements of its management team.

An independent thrift institution headquartered here, Pentagon Federal is regulated by the National Credit Union Administration and has nearly 26 U.S. and overseas branches. The nation's second largest credit union, Pentagon Federal maintains accounts for more than 275,000 Air Force, Army and Department of Defense employees and their relatives and dependents.

Formerly, Pentagon Federal relied on outside service bureaus for its data processing needs. But, according to Comptroller Roger Kane, handling such a large volume of accounts on time-sharing systems was costing the company more than \$250,000 annually. So Pentagon Federal began looking for a less expensive, in-house system. The company's research culminated in the installation of an IBM 4341 equipped with IBM's MVS operating system. At the same time, Kane said, Pentagon Federal began setting up an information center to provide efficient systems for budgeting and account tracking for the company's managers and executives. The Pentagon Federal information center was closely modeled on the IBM information center concept. More than 100 IBM 3279 terminals were linked to the 4341 from executive offices and other central locations. The company also built up a library, staffed the center with consultants and installed a hot line to field user questions.

But, Kane said, "we needed a software tool with 'what-if' capabilities that our management team could use."

Pentagon Federal evaluated about 35 modeling languages and eventually chose Comshare, Inc.'s System W decision support system as its first major information center software installation. According to Kane, the software dovetailed nicely with Pentagon Federal's information center plans.

"We had a long list of requirements," Kane explained. "They included forecasting, inflation adjustments, technical support, multiple-user support and local service support from a stable company. We needed software that would be maintained and enhanced and that would grow with the industry." System W met those requirements.

Pricilla Roach, manager of Pentagon Federal's managerial accounting depart-

ment, said she and other users were impressed with System W's English syntax and comprehensive forecasting capabilities and the software's use of variable names instead of line numbers.

"With System W, I could sit down with our managers and go over calculations, and we would all understand them," she said. "In some

modeling languages, the rules are so complex that using them is like learning how to program."

Pentagon Federal's initial application of System W was building an annual budget model that consisted of loan, share and expense history and developing tracking models with information on member accounts, such as

loans, daily transaction data and certificate, checking account and individual retirement accounts data. Other business data included assets, liabilities, utility costs and personnel expenses.

System W's Window feature, with full screen capability, was particularly useful, Roach said. "It ... [debugs] any kind of input data," she

said. "You can get an immediate look at the bottom line or scroll through details looking for key numbers."

Pentagon Federal's future plans include using System W as a data acquisition link to existing in-house software and installation of System W color graphics for presentations to the firm's board of directors and officials.

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NEWS

Electric firm brightens productivity with net revamp

JACKSON, Mich. — Consumers Power Co. began evaluating its data communications network in early 1982.

"Until two years ago, Consumers Power relied entirely upon conventional 2,400-, 4,800- and 9,600 bit/sec modems supplied by [Michigan Bell Telephone Co.] and AT&T," recounted Daniel Mandreger, telecommunications engineer in the communications systems department. "An upgrade in the network was necessary to accommodate increased traffic and prospective users. Further, transmission problems were becoming evident. We, therefore, decided to evaluate the entire system."

Consumers Power is Michigan's largest electric and gas utility. Its data communications system ties regional offices and power plants to an IBM 3083 mainframe here. Customer records account for 50% of the data transmissions, and the remainder consists of employee information,

manufacturer offered," Mandreger said. "The Codex CS modems and DNCS [Distributed Network Control System 300] gave specific information on a large number of [Electronics Industry Association] digital and voice frequency analog impairments at central and remote ends — from 19 to 23 status points, depending upon the particular model of modem. Also, the DNCS was the only system that would permit us to set our own alarm trip values for each impairment."

Consumer Power decided to lease the Codex equipment, which currently supports 118 CS 9600s for 59 point-to-point lines; 10 Model CS 4800s for five point-to-point lines for

terminal equipment with maximum speeds of 4,800 bit/sec; 80 Model CS 48FPs for 17 multipoint lines; 22 Model MX 2400s for 11 point-to-point lines for the text management system's ink-jet printers; and 25 Model CS 9600s for seven high-speed multipoint lines.

Consumers Power has made extensive use of the DNCS 300 for testing and making benchmark lines prior to bringing them up. Mandreger said the system helped diagnose problems that probably may have otherwise been overlooked. Most line impairments involved impulse hits, low signal levels and low signal-to-noise ratios. Supplementary manual test equipment has been valuable for oc-

casional expanding upon DNCS leads, such as when a circuit is down or for carrier loss.

Although Mandreger said he was generally pleased with the equipment, there have been problems. "Some of the modems has been defective, and we have been continually replacing some system cards," he said.

The telecommunications manager would also like to see the system enhanced. "I would like to be able to run a diagnostic program without operator intervention," he said. "It would allow me to set a test run at night and have the results the next morning — something we can't currently do."

'An upgrade in the network was necessary to accommodate increased traffic. Transmission problems were becoming evident. We decided to evaluate the entire system.'

— Daniel Mandreger, telecommunications engineer

time-sharing, materials management and test management. The network is also called upon to transmit data from remote computerized meter reading equipment to Jackson.

For the evaluation, Consumer Power initiated laboratory testing of modems supplied by several vendors, including Racal Milgo, Inc., Codex Corp. and IBM. In addition to modem performance, circuit diagnostic capabilities were evaluated.

Modem checks were made with an impairment generator and bit error rate tester. Devices were first exposed to the line impairment maximums tariffed in Michigan, with more than one error in 10 million bits transmitted considered the failure point. Additionally, the equipment was subjected to excessive impairment levels and multiple impairments.

"The important differences between modems were seen in the circuit diagnostic information each

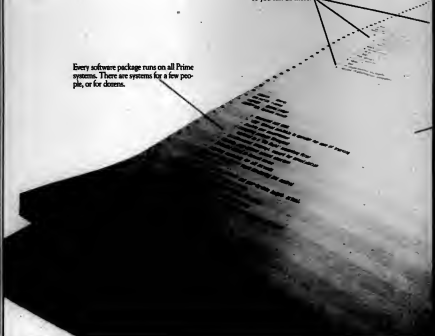
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NEWS

Scientific workstation net expands Yale's capabilities

NEW HAVEN, Conn. — When Yale University decided to increase its computational power to handle the burgeoning number of computer science students and the university's commitment to computer research, it looked to a distributed network of scientific workstations.

The number of undergraduates enrolled in computer science courses at Yale doubled over the past three years, said John H. Goodman, director of operations and development for the computer science department. About 1,400 undergraduates are taking introductory computer courses this year — in fact, 90% of all undergraduates now take at least one introductory course in the subject.

Yale's computer science department had a collection of 24 computers from a variety of vendors to support computer science education and research, Goodman said. Some computers, such as the university's 16 Digital Equipment Corp. VAX-11s, were used for introductory courses; others, such as its five Symbolics, Inc. Lisp machines used for artificial intelligence research, were dedicated to a single purpose, he said.

As the rate of student enrollment in computer science courses grew, these facilities were not enough, he added. At this time, Yale was also expanding the experimental segment of its ongoing research programs in AI, scientific computation and systems.

The school needed a network of machines with substantial computational power that could accommodate about 190 users simultaneously, Goodman said.

The computer science department researched a number of companies and realized that present time-sharing systems could not offer the consistent performance or the transparent resource sharing that they required, Goodman said. The department next researched several companies that manufactured distributed systems, he added.

The university chose Apollo Computer, Inc.'s Domain line of 32-bit scientific and engineering workstations, which operate in a high-speed local-

area network and support network-wide, demand-paged virtual memory, Goodman said. "In choosing the distributed system, we were allowing for unlimited growth in our educational and research network," Goodman added. "Since each workstation has its own dedicated CPU and main memory, adding units to the network in no way decreases power or response time," he said.

In June 1981, the first Apollo computers were up and running. Over the next two years, Goodman said, Yale installed a total of 80 DN300s, 17 DN420s and two DN600 full color graphics workstations.

The total configuration is broken down into two separate rings: one for computer science education and the other for special research projects. The network also has the ability to communicate, via an Ethernet gateway, with other computers within the department, Goodman said.

The educational systems, used primarily for advanced undergraduate and all graduate-level computer science courses, are comprised of 40 DN300s and two DN420s, which are used as file servers because the DN300s run diskless, sharing mass-storage facilities across the network, Goodman said. Each DN420 is configured with a 169M-byte Winchester disk, he added.

The research group consists of 40 DN300s and 20 DN420s with 34M-byte and 169M-byte Winchester disks, respectively. In research, however, the DN420s are not used as file servers, Goodman explained. They offer enhanced graphics capabilities and increased power for programs requiring more main memory. For this reason, each is equipped with an Apollo Performance Enhancement Board, he said. In addition, the research network has two DN600 color graphics stations, used specifically for scientific computation and electrical engineering, he said.

Each workstation offers both the Apollo Aegis operating system and AUX, Apollo's implementation of AT&T's Unix software with University of California at Berkeley extensions, Goodman said. The Apollo systems each provide a multitasking multitasking environment, which allows up to 24 programs to run simultaneously on the same display, he explained. Given these capabilities, a student can be in the process of running a number of given programs while accessing another program or file from another workstation — all at a data transfer rate of up to 12M bit/sec, he said.

In addition to the research and basic computer science education that had been the department's original focus, the new systems provide the computational power for such applications as numerical analysis, computer architecture and attached processor research, oil reservoir simulation, geophysical seismics, computational field dynamics and structural analysis, Goodman said, which are now an integrated part of the university's educational and research efforts.

In addition, the new system is used for AI research and systems research, which involves the study of languages, programming environments, operating systems and network technology, he added.

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Powerful relational data management technology forms the "nucleus" of our integrated software family. Using a unique "Logical View" concept, all applications operate directly with "derived relational tables." As a result, we can provide complete data structure independence, as well as the high performance needed for today's production environments. This relational technology is the nucleus of both our TIS family of information products for IBM users and our ULTRA INTERACTIVE DATA BASE SYSTEM™ for DEC VAX™ users.

#2 Fourth Generation Application Development

The perfect complement to our relational data management technology is our industry acclaimed 4th Generation application development system, MANTIS™. In more than 1,500 complex production environments, MANTIS is dramatically reducing the application backlog through its powerful ability to "prototype", refine and commit the application to production in one interactive sitting.

#3 Manufacturing Control Software

CONTROL™, MRPS is our sophisticated manufacturing control system that is fully integrated

You should know how our integrated family of software technologies meets all your information processing needs.



The New Cincom: Integrated Family of Software Technologies

The New Cincom family of software technologies is a single family of integrated products capable of meeting all of your corporate, departmental and personal information software needs. Here are just 10 of the many reasons why your organization should be considering TIS:

ULTRA™ is a new VAX/VMS™ system that provides a complete environment for the development and execution of applications. It is the only system that can run both VAX/VMS and ULTRA applications on the same hardware.

CONTROL™, MRPS is our sophisticated manufacturing control system that is fully integrated with our other software technologies. It provides a complete environment for the development and execution of manufacturing control applications. It is the only system that can run both CONTROL and other applications on the same hardware.

The New Cincom: Enterprise Information System

The New Cincom Enterprise Information System is a single family of integrated products capable of meeting all of your corporate, departmental and personal information software needs. Here are just 10 of the many reasons why your organization should be considering TIS:

reasons why we're endor you'll ever need.

with our relational data management technology. A complete closed-loop system, MRPS is improving the productivity and profitability of over 125 IBM and DEC VAX manufacturing environments around the world.

#4 Financial Control Software

CONTROL: Financial is our sophisticated financial accounting and control system which molds to the way you do business. Integrated directly with MRPS, **CONTROL:** Financial includes Accounts Receivable and Credit Management systems with Accounts Payable soon to follow.

#5 Advanced Network Management

NET/MASTER is one of the most recent additions to the TIS family of integrated products. Very simply, **NET/MASTER** is an advanced network management system that takes the complexity out of managing a sophisticated IBM computer network and lays the groundwork for distributed data base processing.

access multiple file types stored in the corporate data base for Decision Support manipulation.

#7 Micro Decision Support Software

For comprehensive micro-level Decision Support we offer **SeriesOnePlus**™. **SeriesOnePlus** includes file management, spreadsheet, graphics, reporting and word processing components that are all integrated through a unique "BUS" architecture. Because the system is designed exclusively for business situations, **SeriesOnePlus** complements any mainframe-micro network strategy.

#8 Mainframe Decision Support Software

The recently introduced **MAIN/MASTER**™ provides powerful Decision Support capabilities for the mainframe. **MAIN/MASTER** is a powerful tool for analyzing and managing data in the mainframe environment. It provides a comprehensive set of tools for data analysis and reporting.

integrated technologies has been released since 1981. And, quite frankly, we believe TIS provides the highest degree of reliability, integration, performance and value in the industry.

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NEWS

Hospital's flexible accounting tool a healthy asset

PHILADELPHIA — The teaching hospital at Thomas Jefferson University here is happy that in 1981 it chose a general ledger software package for its flexibility, because changes in the government's Medicare reimbursement formula will now require updated software.

The Health Care Financing Administration of the U.S. Department of Health and Human Services changed its Medicare reimbursement plans as of July 1984. Thomas Jefferson University plans to merge its financial software with a cost accounting software package to form an integrated accounting system.

The changes were needed to respond to the new Medicare reim-

bursment plan, in which all illnesses and treatment patterns have been classified into diagnosis relation groups with a fixed price for treating each patient. Medicare reimburses hospitals for the allotted expenses, but if the hospital exceeds the fixed price, it must cover the remaining costs on its own.

"For Thomas Jefferson University, this means we must achieve reimbursements from Medicare with a minimum of disruption to our hospital's budget," said Erik Ostergaard, associate controller at the hospital.

With an annual operating budget of more than \$300 million, Thomas Jefferson University functions as a business as well as a hospital and a

university. In addition to maintaining a private medical college and supplying health care services, Thomas Jefferson University accounts for 450 grants from sponsors and operates three student housing facilities as well as a building for office rentals.

Prior to buying the general ledger program from Software International Corp. in 1981, the hospital was summarizing payroll, accounts payable and inventory manually. "It was very ineffective because it was not detailed enough or accurate enough to provide the reports we needed for management and accounting," Ostergaard said.

The university considered general

ledger packages from 12 vendors at first, according to Patricia Iberer, project manager at Thomas Jefferson. The 12 vendors were narrowed down to six, which were invited in to make presentations. From those, Software International's package was chosen for its on-line capabilities as well as its flexibility, Iberer said.

The hospital's data center runs an IBM 3083 and 3033 on the MVS operating system. Iberer said packages from IBM were not considered.

Visited near site

Ostergaard said the hospital staff's visit to a Software International user site was also a decisive factor in the move to purchase the Software International general ledger. "We were impressed that a user at that site had only been operating the software for three months and was already using it successfully. For an accounting department with almost no computer experience, that was important."

He added, "We wanted a software package that could handle our wide range of accounting functions — from project and research accounting to encumbrance and cost accounting." Iberer said. "The primary objective was to find a way to provide management with timely and accurate reports that would be useful to all levels of management." The software can generate reports on balance sheets, income statements and various management analyses.

Minor problems were experienced when the package was first installed. "Nothing's perfect," Iberer said. But Software International responded well in correcting the problems, she said.

Reports will now become more detailed to meet diagnostic relation group requirements, Ostergaard said. "Now we will have to assume the risk for differences between our cost for providing a service and the fixed price," he said.

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Thomas F. Cull,
International UNIX marketing expert and consultant who served as president of Interactive Systems Corporation during their development of PC/IX and VM/IX for IBM.

Joseph G. DiGiacomo,
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IEEE selects next president

NEW YORK — The Institute of Electrical and Electronics Engineers, Inc. (IEEE) has elected Dr. Bruno O. Weinreich as president of the institute.

Weinreich, president and chief engineer of Weinreich Engineering Co. of Gaithersburg, Md., will serve as IEEE president-elect during 1985 and will assume the title of president in 1986.

Current IEEE President Dr. Richard J. Gowen, president of Dakota State College in Madison, S.D., will be replaced as IEEE president in the coming year by Charles A. Eddon, manager of capital equipment for Hewlett-Packard Co. in Palo Alto, Calif.

Merlin G. Smith, technical assistant to the vice-president of logic and memory at the IBM T. J. Watson Research Center in Yorktown Heights, N.Y., was elected IEEE executive vice-president for 1985.

The IEEE is located at 345 E. 47th St., New York, N.Y. 10017.

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NEWS



CALENDAR

WEEK OF DEC. 16

DECEMBER 17-18, ORLANDO, FLA. — **Workshops.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32806.

DECEMBER 17-18, WASHINGTON, D.C. — **Alertiveness for Success.** Contact: Control Data Management Institute, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 17-19, HARTFORD, CONN. — **CMS for Application Programmers.** Contact: Don Florek, The

Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-19, NEW ORLEANS — **The Institute of Electrical and Electronics Engineers First International Conference on Office Automation.** Contact: Institute of Electrical and Electronics Engineers Computer Society, P.O. Box 638, Silver Spring, Md. 20901.

DECEMBER 17-19, HARTFORD, CONN. — **OS/VS TSO/BPF Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-19, WASHINGTON, D.C. — **On-Line Operations Management.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 17-19, WASHINGTON, D.C. — **Configuration Management of Software Programs.**

Contact: George Washington University, Continuing Engineering Education, School of Engineering and Applied Science, Washington, D.C. 20052.

DECEMBER 17-20, HARTFORD, CONN. — **Pascal Programming Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-20, CHICAGO — **Data Communications: Concepts, Systems and Networks.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 17-21, HARTFORD, CONN. — **Structured Analysis & Design Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 17-21, NEW YORK

— **CHCS Internal Architecture.** Contact: Syed, Inc. 35 W. 35th St., New York, N.Y. 10001. Also being held Jan. 14-18 in Chicago.

DECEMBER 17-21, ORLANDO, FLA. — **Vasm Programming Workshop.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32806.

DECEMBER 17-21, WASHINGTON, D.C. — **Internet Systems and Protocols.** Contact: George Washington University, Continuing Engineering Education, School of Engineering and Applied Science, Washington, D.C. 20052.

DECEMBER 17-21, NEW YORK — **MSV Job Control Language.** Contact: Syed, Inc. 35 W. 35th St., New York, N.Y. 10001. Also being held Jan. 7-11 in New York.

DECEMBER 17-21, ORLANDO, FLA. — **Integrated Data Dictionary Workshop.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32806.

DECEMBER 19-20, NEW YORK — **Unix: A Manager's Perspective.** Contact: American Management Association, P.O. Box 818, Saranac Lake, N.Y. 12983.

DECEMBER 19-20, HARTFORD, CONN. — **DOS/VSE Job Control Language.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

WEEK OF DEC. 23

DECEMBER 27, NEW YORK — **Syad, Inc.'s Annual Training Forum.** Contact: Syed, Inc. 35 W. 35th St., New York, N.Y. 10001.

DECEMBER 27-28, NEW YORK — **CHCS Performance Design.** Contact: Syed, Inc., 35 W. 35th St., New York, N.Y. 10001.

WEEK OF DEC. 30

JANUARY 2-4, HONOLULU — **Hawaii International Conference on System Sciences.** Contact: Naim B. Lau, Center for Executive Development, College of Business Administration, University of Hawaii, 2404 Maile Way, C-202, Honolulu, Hawaii 96822.

WEEK OF JAN. 6

JANUARY 7-8, KANSAS CITY, MO. — **Discover Unix.** Contact: Data-Tech Institute, P.O. Box 2428, Lakeview Plaza, Clifton, N.J. 07015. Also being held Jan. 10-11 in Boston, Jan. 14-15 in Houston and Jan. 17-18 in San Francisco.

JANUARY 7-8, HARTFORD, CONN. — **Unix Systems Users Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-8, DALLAS — **Operating Systems: A Comparative Analysis.** Contact: Data-Tech Institute, P.O. Box 2428, Lakeview Plaza, Clifton, N.J. 07015. Also being held Jan. 14-15 in Boston.

JANUARY 7-9, ARLINGTON, VA. — **SAS Basics Course.** Contact: SAS Institute Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Jan. 9-11 in Tampa, Fla., Jan. 15-17 in Cary, N.C., and Jan. 22-24 in San Francisco.

JANUARY 7-9, NEW YORK — **PC/Pcans for Beginners.** Contact: See JANUARY page 58



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redundancy is in expensive software, this is true. But Stratus has hardware-based fault tolerance that takes advantage of the extraordinary advances in chip technology. The result—price drops. The fact of the matter is, our hardware redundancy adds a mere fraction to our cost, and absolutely nothing to our purchase price. What's more, in overall price/performance comparisons against the top computer names, including IBM, DEC, and Hewlett Packard, Stratus was at the front of the pack, despite the fact that it included fault tolerance, while the others didn't.

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Relative Price Performance Index
*Computerworld, August 20, 1984

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NEWS

JANUARY from page 56

Julie Leonard, Advanced Infrastructure, Inc., 475 Park Ave., New York, N.Y. 10017.

JANUARY 7-9, DALLAS — VM/SP Structure, Flow & Tuning. Contact: Betty Bruce, Goal Systems International, Inc., 4545 N. High St., Columbus, Ohio 43214.

JANUARY 7-10, NEW YORK — CICS Debugging. Contact: Sysed, Inc., 35 W. 36th St., New York, N.Y. 10001.

JANUARY 7-10, HARTFORD, CONN. — Designing On-Line Systems. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-11, HARTFORD, CONN. — CICS/VS Command-Level Coding Workshop. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 7-11, RALEIGH, N.C. — Unix Workshop. Contact: Suzanne Battista, Course Manager, Plum Hall, Inc., 1 Spruce Ave., Cardiff, N.J. 08232.

JANUARY 7-11, HARTFORD, CONN. — OS/VS Job Control Language & Utilities. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 8-9, SAN FRANCISCO — Integrating Multivendor Voice and Data Networks. Contact: Marilyn Chastee, The DMW Group, Inc., 2020 Highback Road, Ann Arbor, Mich. 48104.

JANUARY 8-10, CHICAGO — Corporate Electronic Publishing Systems: A Conference/Showcase. Contact: Corporate Electronic Publishing Systems, Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06906.

JANUARY 8-10, CARY, N.C. — SAS Programming for New Computer Users. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JANUARY 8-10, COLLEGE PARK, MD. — Designing Interactive Computer Systems: A Software Psychology Workshop. Contact: Conferences and Institutes Program, The University of Maryland University College, University Blvd. at Adelphi Road, College Park, Md. 20742.

JANUARY 8-10, LOS ANGELES — Selecting a Local-Area Network. Contact: Marketing Manager, Technology Concepts, Inc., Old County Road, Sudbury, Mass. 01776.

JANUARY 8-11, NEW YORK — Vms. Contact: Sysed, Inc., 35 W. 36th St., New York, N.Y. 10001.

JANUARY 8-11, NEW YORK — Systems Network Architecture: Concepts, Design and Implementation. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Gary St., Santa Ana, Calif. 92706. Also being held Jan. 21-23 in Los Angeles.

JANUARY 8-11, ARLINGTON, VA. — SAS Macro Language. Contact: SAS Institute, Inc., Education Division, Box 8000, SAS Circle, Cary, N.C. 27511.

JANUARY 8-11, HARTFORD, CONN. — Unix C Programming Language Workshop. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 8-11, CARY, N.C. — SAS Applied Time Series Analysis & Forecasting Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary,

N.C. 27511.

JANUARY 9-11, CHICAGO — Relational Data Bases. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810. Also being held Jan. 14-16 in Atlanta.

JANUARY 9-11, WASHINGTON, D.C. — National Conference on Financial Management Systems for Government. Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903.

JANUARY 10, SAN FRANCISCO — TI Carrier Strategies: The New Networking Imperative. Contact: Marilyn Chastee, The DMW Group, 2020 Highback Road, Ann Arbor, Mich. 48104.

JANUARY 10-11, ARLINGTON, VA. — SAS Report Writing. Contact: SAS Institute, Inc., Education Division, Box 8000, SAS Circle, Cary,

N.C. 27511.

JANUARY 10-12, HOUSTON — The Essentials of Productivity Management. Contact: The Institute of Industrial Engineers, Continuing Education Program Department, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

JANUARY 12-13, NEW YORK — CICS Command-Level Intensive. Contact: Sysed, Inc., 35 W. 36th St., New York, N.Y. 10001. Also being held Jan. 19-20 in New York.

WEEK OF JAN. 13

JANUARY 13-16, NEW YORK — Annual Convention and National Retailers Business & Equipment Exposition. Contact: National Retail Merchants Association, 100 W. 31st St., New York, N.Y. 10001.

JANUARY 13-16, HONOLULU — Seventh Annual Conference of the Pacific Telecommunications Council. Contact: Pacific Telecommunications Council, 35, Suite 300, 1110 University Ave., Honolulu, Hawaii 96828.

JANUARY 14-15, SAN FRANCISCO — Taking Charge: New Directions for Data Entry Management. Contact: Marilyn Bodek, Data Entry Management Association, P.O. Box 16711, Stamford, Conn. 06906.

JANUARY 14-15, HARTFORD, CONN. — Personal Computers — Hands-on Workshop. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 14-16, ST. LOUIS — DOS/VSE Internals, Debugging & Problem Determination. Contact: Betty Bruce, Goal Systems Interna-

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NEWS

tional, Inc., 5455 N. High St., Columbus, Ohio 43214.

JANUARY 14-17, ANAHEIM, CALIF. — Cadcon West '85 Conference & Exposition. Contact: Morgan Grampian Expositions Group, Two Park Ave., New York, N.Y. 10016.

JANUARY 14-18, SAN FRANCISCO — CROS Command-Level Programming. Contact: Syed, Inc., 35 W. 38th St., New York, N.Y. 10001.

JANUARY 14-18, WASHINGTON, D.C. — Software Engineering and Quality Assurance: A Statistical Approach. Contact: Dick White, George Washington University, Continuing Engineering Education, School of Engineering and Applied Science, Washington, D.C. 20052.

JANUARY 14-18, SAN DIEGO — Computer Capacity Planning for Sperry 1100 Systems. Contact: Compumetrics Training Institute, P.O.

Box 58683, Houston, Texas 77258.

JANUARY 15, ARLINGTON HEIGHTS, ILL. — The Association for Information and Image Management Seminar. Contact: The Association for Information and Image Management, 821 N. Stratford Road, Arlington Heights, Ill. 60004.

JANUARY 15-16, LAKE BUENA VISTA, FLA. — Foundation for Growth: Productivity and Quality in Application Development. Contact: Nolan, Norton & Co., One Forbes Road, Lexington, Mass. 02173.

JANUARY 15-16, CARY, N.C. — SAS Color Graphics. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JANUARY 15-16, HARTFORD, CONN. — OS/VSE Operating Systems Concepts. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 15-18, HARTFORD, CONN. — Computer Systems Fundamentals. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 16, BELLEVUE, WASH. — Unix for Managers. Contact: Kathy Howard, Specialized Systems Consultants, P.O. Box 7, Northgate Station, Seattle, Wash. 98125.

JANUARY 16-18, CARY, N.C. — SAS Processing Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JANUARY 16-18, HARTFORD, CONN. — Data Base Systems Analysis and Design. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 16-18, HOUSTON — PC World Exposition. Contact: Maurs Fitzgerald, Sterling Public Re-

lations Group, 222 Third St., Cambridge, Mass. 02142.

JANUARY 16-18, HARTFORD, CONN. — Electronic Spreadsheets: Lotus 1-2-3, Multitask and Supervisor. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 16-18, NEW YORK — Designing Pumps Systems. Contact: Julie Leonard, Advanced Infrastructure, Inc., 475 Fifth Ave., New York, N.Y. 10017.

JANUARY 17-18, WASHINGTON, D.C. — Information Centers. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

JANUARY 17-18, BOSTON — Design Concepts, Applications and Introduction to Programming. Contact: Center for Advanced Professional Education, Suite 110, 1830 E. Gary St., Santa Ana, Calif. 92705.

JANUARY 17-18, HARTFORD, CONN. — ANS Cobol OS Dump Analysis. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

WEEK OF JAN. 20

JANUARY 21, BOSTON — How to Document a Computer System. Contact: Technical Communications Associates, Suite 210, 1250 Oakmead Pkwy., Sunnyvale, Calif. 94096.

JANUARY 21-22, ORLANDO, FLA. — Vcam OS & DOS Performance & Tuning. Contact: Betty Bruce, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

JANUARY 21-23, ATLANTA — EDP Auditing & Controls. Contact: Laurie Christie, Training Services, MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 21-23, ATLANTA — Auditing Advanced Computer Systems. Contact: Laurie Christie, Training Services, MIS Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 21-23, PORT LAUDERDALE, FLA. — Office Information Systems Conference. Contact: Lynn Bentley, Gartner Group, Inc., P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.

JANUARY 21-23, LOS ANGELES — Auditors Role in Systems Development. Contact: Laurie Christie, Training Services, MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 21-24, LOS ANGELES — CROS Application Design. Contact: Syed, Inc., 35 W. 38th St., New York, N.Y. 10001.

JANUARY 21-25, DALLAS — Uniform: The International Conference of Users. Contact: Uniform, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

JANUARY 21-25, HARTFORD, CONN. — ANS Cobol Programming Workshop 1. Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

JANUARY 21-25, RALEIGH, N.C. — C Programming Workshop. Contact: Suzanne Battista, Plum Hall, Inc., One Spruce Ave., Cardiff, N.J. 08832.

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Personal Computer Software

VIEWPOINT

Striking DP hardware/budget balance a delicate task



THE DATA CENTER
John P. Murray

How much information processing hardware is the right amount for a given installation? There is no one correct answer, of course. But, there is a method we can use to develop a rational discussion about the issue with senior management.

Sooner or later, the issue of too much or too little information processing hardware will arise. Too much hardware represents excessive expense; too little may raise questions about a perceived failure to use information processing technology aggressively.

The best approach is to alert senior management to the expense associated with information processing hardware before the subject becomes a critical issue. The appropriate expense for an organization is an issue relative to the expectations of senior management regarding the goal of the information processing function.

Criteria must be developed to de-

termine the correct balance between information processing hardware capacity and expense. One method is to determine what level of overall information processing service senior management considers appropriate. When that has been determined, a plan should be developed that will deliver that level of service.

The approach sounds very straightforward, and it is, which may be the reason why it is not used more often. It may also be the case that although senior management members agree, they do not fully comprehend the implications of the proposed plan.

How, then, might the process work?

The first step is to consider the various components that will determine the level of service the information processing department offers to the client community. Some of those components might include adherence to the data center schedule for production of reports, agreement to process all incoming orders within a given amount of time, maintaining a certain level of processing network availability and providing a selected maximum CRT response time across the network.

An additional consideration might be guaranteeing a certain level of systems and programming test terms within a given period of time. Ultimately, this will determine the amount of progress made toward enhancing existing systems or develop-

ing new ones.

Perceived needs of organization

The list of potential components can encompass a number of items, depending upon the perceived needs of a particular organization. The mix will be different in every organization, based upon senior management's view of the mission of the information processing department.

The issue of the right amount of hardware to install can be reduced to a question that asks, "What do you want to do; what do you want to pay?" Conversely, the question might be rephrased as, "How much pain are you willing to endure?"

If the information processing department can obtain an answer to the above question, it should then become possible to provide the right amount of hardware.

Yet, even though it seems straightforward, the issue is not quite that simple. To come to some reasonable position, the potential for growth of demand must be taken into consideration.

Pain-sharing exercise

This can be viewed as a pain-sharing exercise between information processing and the rest of the organization. The trick is to judge the growth in the processing demand accurately so that neither the pain of the expense nor the reduced levels of service as the hardware reaches its

saturation point are excessive.

This is, of course, a very difficult proposition, particularly if the time span is several years. It is not easy to foresee the items to accommodate; any radical change in the needs of the organization will have a negative impact on the hardware configuration.

An unanticipated increase in the work load will decrease the service level from information processing, indicating that too little hardware is in place. Conversely, a decrease in the anticipated work load may lead to an improvement in the service level response time, but the expense associated with the service level, in terms of too much hardware, may then become an issue.

The concern here is not only with appropriate planning but also with coming to an agreement about the correlation between information processing hardware, the overall information processing service level and the acceptance of the associated expense.

The results will never be perfect, but improvements can be made that may help forestall the difficulty that arises from too much or too little information processing hardware.

The eventual course may be somewhat smoother if information processing staff and senior management can understand and agree on the issues prior to expending funds on hardware or raising clients' expectations relative to their service level.

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, published by Dow Jones-Irwin.

Electronic data systems: Public service or federal crime?



HUMAN CONNECTION
Jack Stone

If you want to get your Monday morning jolts flowing in a hurry, run through this scenario: A few minutes after your arrival for another tranquil week at the computer center, there is some heavy-handed knocking at the machine room door. You casually mosey over to open it, thinking that the visitor is one of the more irascible users who is missing some output.

What you find instead is a cadre of heavily armed, highly intelligent police whose spokesmen flashes a legal looking document past you and loudly proclaim, "We have a complaint against this business that alleges that it is using computing and communications equipment in the commission of a felony. This is a search warrant that entitles us to enter your premises and confiscate any and all equipment which may be involved in this illegal act. We demand that you shut down power immediately, and show us where the loading ramp is so that we can back up our trucks and haul off your system."

Impossible, you say? I'm not so sure, particularly in light of what happened to one Tom Teimpidis of Los Angeles. If you haven't heard about the case, let me brief you on it.

This man is one of hundreds of electronic bulletin board operators who run an informal network

for the communication of electronic mail over personal computer systems, something loosely akin to what ham operators do in the amateur radio arena.

Earlier this year, Teimpidis' home was invaded by Los Angeles police armed with a felony search warrant who preemptively removed some equipment (later returned) after a complaint was issued

The basic issue in the case, one that raises interesting questions for all computer centers that support public data systems is this: To what extent is the system operator responsible for the monitoring and control of the data that flows through the system?

against him. The complaint alleged that he was involved in the distribution of illegally obtained credit card information — namely telephone credit card numbers and network access codes — through his system. He later stated that he was unaware that such information was present.

The basic issues in the case, one that raises interesting questions for all computer centers that support public data systems is this: To what extent is the system operator responsible for the monitoring and control of the data that flows through the system?

One side of the issue is that while the system operator is performing a community service (oper-

ators typically charge the public little or nothing to sign up, as long as the telephone charges are prepaid). The service is similar to that of a bulletin board at a college social center, and the operator has no control over what the users post. On the other side, one can view the system operator as an information publisher and disseminator, operating under legal constraints, and responsible for ensuring the legality, as well as the accuracy, of data.

I can't help wondering — and perhaps you should as well — to what extent computer centers are vulnerable to such complaints and about the prospect of having a mainframe shipped out the back door while the system manager watches helplessly.

Now I grant that there was a special factor in the Teimpidis case that encouraged the police to act: the complaint was made by a billion dollar organization (Pacific Telephone company) and the defendant-to-be was a private consultant with few resources to fight back. But there has been a considerable amount of publicity attached to the case that has extended well beyond the computer community and may easily encourage legal action in any issue pertaining to the validity, sanctity and/or legality of records in public data system files.

After all, these days there are powerful activist organizations in the consumer, industrial and government sectors who are willing to take legal action against anyone or any company if they believe their cause is just.

And one case of an ill-behaved charge code number or a substantive error in a credit rating or the release of private information without authorization may be just the spark that sets one of them off crying "Folony" or "Libet" or "Invasion of privacy", with the resulting possibility of equipment confiscation.

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

VIEWPOINT

Academia must study benefits, costs of high-tech gifts



**READER'S
PLATFORM**
Fritz H. Grape

The pull of technology has brought many colleges and universities into the computer age. Institutions of higher education are keenly aware that their status as a "computing power" affects, among other things, their ability to attract and retain students and faculty; their capa-

Grape is the coordinator for Campus Computing Services at the University of Nevada-Reno.

bility for managing their resources and their standing in the public mind as an up-to-date place to study.

It is not surprising, then, that colleges are aggressive in their pursuit of corporate gifts of computing equipment.

Many high-technology corporations have responded with gifts of equipment and money to support research and teaching. Indeed, many corporate contribution programs have been initiated by the corporations to foster growth in specific developmental areas. Without these gifts, higher education would be much poorer.

Corporations clearly benefit from donations such as these. At times,

saleable products are realized that boost sales. Donations in support of research are recognized with federal and state tax credits that are sometimes in excess of the dollar value involved.

Association with a local university beneficially affects the corporation's image. Students who learn on particular brands of computers can establish a brand loyalty that stays with them when they become purchasers of computer equipment in the commercial world. Maintenance contracts will also benefit the donor.

University personnel, tantalized by the very visible support provided by computer companies, look for donated support whenever they can.

They must meet the growing demands of students within the constraints of their university's budget.

■ Equity. A major question for the public schools is whether more affluent districts, able to afford large numbers of microcomputers, are providing a better education for their students than is possible for less wealthy districts.

Faculty in less prestigious institutions watch with envy as some universities and colleges that are already exceptionally well supported receive added equipment and gifts.

Breaking the cycle

And these faculty members know they are in a cycle in which poor equipment and facilities make attracting and developing faculty difficult. In turn, students with an interest in computing look elsewhere for an education. How does the cycle get broken?

■ Maintenance and support. Many institutions that find themselves caught in the pressures of a less than booming economy accept whatever computer equipment they can from any source they can obtain it from in the expectation that the equipment will strengthen their educational program. Often it does.

However, administrators and faculty not familiar with such equipment too often overlook the costs implicit in such gifts. They underestimate the maintenance costs that are incurred. They forget to ask about staffing requirements, about facilities that need modification, about power requirements and about additional furnishings needed to make a system fully functional. They may not have the knowledge that enables them to decide whether the equipment really advances them toward their goals.

■ Obsolescence. "Never look a gift horse in the mouth," it is said. But it would be a foolish recipient who accepts and attempts to put into use every computer offered him.

When the school's own money is involved, intricate bidding procedures are usually in place to force the school to determine which bid brings the best product. This is not necessarily so when gifts are involved.

■ Product delivery. Applied research projects have had a continuing, yet uneasy, presence on campus. The "contribution" of equipment with the hook that a deliverable, marketable product in forthcoming bears review. To what extent does the development of marketable products reinforce or detract from the educational goals of the institution? What happens to colleges for which teaching, not research, is of primary importance? Are they locked out again?

The issues noted above are not cited as reasons to forgo the real capacity for industry to aid in research and education on college campuses. However, gift giving and gift receiving are things that require thought and a clear sense of values. An effort needs to be made to assist all colleges and universities to acquire satisfactory instructional computing facilities.



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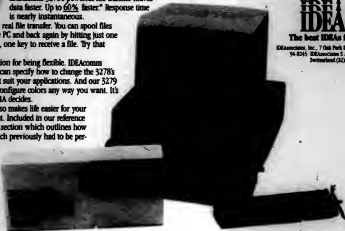
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SOFTWARE & SERVICES

Joint venture benefits user

Working with vendor yields better packages

By Paul Gilman
CW Staff

SAN DIEGO—There is an alternative, though little used, to the "make or buy" decision on applications software. One can develop the package in concert with the vendor, exchanging functional expertise with the vendor's technical knowledge.

That option has worked well for CTS Corp., a diversified manufacturing firm based in Elkhart, Ind. CTS is now installing seven copies of a materials requirements planning (MRP) software package on IBM System/38 computers, each serving a different division of the corporation.

According to Mike Sherck, a programmer/analyst, and Kent Milnes, MIS manager, the experience was not without difficulties, but it did result in an MRP system that fit CTS's needs more closely than one purchased off the shelf. Sherck

and Milnes were interviewed at the recent Fall User Conference sponsored by Professional Computer Resources (PCR) of Oak Brook, Ill.

The scarcity of native-code MRP systems for the System/38 prompted CTS to approach PCR, which develops native System/38 software. PCR was thinking about getting into manufacturing, and the combination of the two companies' skills seemed to be a good fit, Milnes said.

The companies were especially careful in drawing up the sales contract, Sherck said. "It was developed in large part in parallel with the design," he said. "We went through requirements definition, functional design and detailed design and signed the contract after the functional design."

The contract provides for CTS to receive PCR page 66



Milnes (l) and Sherck

Cts photo by P. Gilman

Subschema key in proper use of DBMS

Basic rules maintain independence of data

First of a two-part article

By Mike Ruggera
Special to CWI

The worst thing that can happen to a data base management system (DBMS) is to use it as a file access method instead of as a data base. That this happens at all is primarily due to the data base specialist, who is concerned with arranging the data elements in a fashion that reflects the physical world but with reasonable processing efficiency.

He must concentrate on the physical representation of the data, on navigation through the data base segments and on keeping track of the currency of the data at each level in the data base.

On the other hand, the production programmer is concerned with accessing the data elements he needs in an order appropriate for his program. The vehicle to bridge the connection between the data base's physical structure and the programmer's data element needs is the subschema.

The following three basic rules can help provide data independence between data bases and the programs that use them.

■ **Avoid data base navigation;** instead, let the subschema perform any navigation required, and let the programmer work with a flat file representation of the data.

■ **In record searches,** express all search arguments and their keys. Let the DBMS, through the subschema, decide if there are indexes and segment keys that can be used to make the search more efficient.

■ **Use a DBMS to implement major systems** consisting of subsystems; each subsystem has its own subschema that refers to the DBMS page 67

Ruggera is a DP management consultant based in Forti, N.J.

■ **CGA Software Products Group, Inc.'s Top Secret security software** is now available in the Cullinet Software, Inc. IDMS environment/66

■ **An intelligent link between micro spreadsheets and DEC VAX computers** has been introduced by Ross Systems, Inc./66

■ **Artificial Intelligence Corp. has announced two new implementations of its Intel query language/67**

■ **A change control system for software development projects** is now available to Digital Equipment Corp. VAX users/67

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IBM offers ISPF for SSX/VSE, enhances VM system version

WHITE PLAINS, N.Y.—IBM has extended the functionality and widened the operating range of its Interactive Systems Productivity Facility (ISPF) with the announcement of an enhanced version of ISPF for the VM operating system and the introduction of an ISPF version for its SSX/VSE operating system.

According to a spokesman, both IBM's base ISPF system and the ISPF/Program Development Facility (PDF) are now available for use with SSX/VSE. In addition, Version 2, Release 1 of ISPF for VM/SP environments was released with what IBM labeled as significant function and usability

enhancements in the dialogue management facilities.

The announcements, in conjunction with the release of ISPF for MVS earlier this year, mean that an application developed under ISPF can now be run under any of the three main IBM operating systems in use today—MVS, VM or VSE.

The availability of ISPF for SSX/VSE is said to provide complete cross-system capability for the dialogue manager function of ISPF, which provides control and services to support the processing of interactive applications (dialogues) in different

See ISPF page 66

MVS/VS1 Users

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SOFTWARE & SERVICES

CGA extends Top Secret package to Cullinet systems

HOLMDEL, N.J. — CGA Software Products Group, Inc. has announced that its Top Secret security software for IBM mainframes has been extended to provide protection for Cullinet Software, Inc. IDMS/DC and IDMS/CICS environments.

According to a spokesman, no modifications to IDMS will be required to install support

for the security software. Top Secret IDMS will reportedly operate on any release of IDMS 10.0 and above. All users must identify themselves to the Top Secret security system through a user sign-on.

The IDMS version offers all of the security software's password features, including password masking, minimum

password length, suppression of vowels, random generation of passwords, no password option, automatic password expiration and automatic suspension threshold.

The spokesman said IDMS terminal security will include distributed administration, auditor, time-of-day protection, day-of-week re-

strictions, facilities and source limitations. Users may be specifically excluded from certain IDMS transactions.

All Top Secret on-line administration commands are available in IDMS/DC or CICS region to provide on-line security control and maintenance capabilities on either a centralized or decon-

tralized basis.

The extended version of Top Secret for IDMS is scheduled for release in the second quarter of next year. It will be available on a lease basis with a starting price of \$10,900.

CGA Software Products Group is located at 940 Holmdel Road, Holmdel, N.J. 07733.

Ross offers micro link to VAX-11

PALO ALTO, Calif. — Ross Systems, Inc. has introduced an intelligent bridge between microcomputer spreadsheets and Digital Equipment Corp. VAX-11 superminicomputers.

According to a spokesman, Maps/Microlink allows micro-based spreadsheets, such as Lotus Development Corp.'s 1-2-3, to share data with Ross Systems' accounting and decision support applications residing on a VAX-11 supermini.

The bridge is designed to integrate with Maps/Model and Maps/General Ledger (GL), the company's general ledger and financial software.

By using a single command, financial managers reportedly can transfer data from the micro to the applications on the VAX-11. Maps/Microlink allows 1-2-3 spreadsheets to be collected and consolidated in conjunction with Maps/Model, the company's VAX-11-based financial modeling software. In addition, the bridge software provides a direct 1-2-3 data transfer to and from Maps/GL.

Communications modules within the product run independently on the IBM Personal Computer and the VAX-11 to provide error-free, two-way communications between the computers. Maps/Microlink is priced at \$10,000.

Ross Systems can be reached at Suite 210, 1860 Embarcadero Road, Palo Alto, Calif. 94303.

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SOFTWARE & SERVICES

Aide-De-Camp available for DEC's VMS

CONCORD, Mass. — Software Maintenance and Development Systems, Inc. (SMDS) has announced that its Aide-De-Camp (ADC) change control and information management system is available for Digital Equipment Corp.'s VMS operating system.

According to a spokesman, the product, which was formerly available only for the

AT&T Unix operating system, helps manage software development projects by maintaining software sources and changes to the software in a data base. ADC can manage software written in any language, the spokesman said.

Changes are treated as logical units that can be added to or subtracted from a

named base version. New versions can serve as base versions for future developments, the vendor said.

ADC can maintain any number of versions or changes to a project, and a single ADC data base contains all versions of the software being developed along with significant information about the software.

Information includes named entities, code, changes, versions and external documentation and can be accessed on-line or through reports, according to the vendor.

Single-site licenses for ADC start at \$6,000. More information is available from SMDS, P.O. Box 555, Concord, Mass. 01742.

Intellect versions introduced

WALTHAM, Mass. — Artificial Intelligence Corp. has introduced two new versions of Intellect, its natural language query system for IBM mainframes.

Intellect/SX reportedly allows nontechnical users to create data dictionaries for building a data base. It is said to offer the same natural language capabilities as Artificial Intelligence's Intellect product and to use AI capabilities to retrieve data from IBM mainframe data bases.

Intellect Focus reportedly consists of Intellect, for data retrieval using conversational English, and Information Builders, Inc.'s Focus, a fourth-generation language and data base management system that includes presentation graphics, report formatting, statistical analysis and financial modeling capabilities.

Intellect/SX and Intellect Focus are each priced at \$30,000 and run on the IBM 30 series, 4300 series and 370 series mainframes.

Artificial Intelligence is located at 100 Fifth Ave., Waltham, Mass. 02254.

SYSTEMS
SOFTWAREAPPLIED INFORMATION
DEVELOPMENT, INC.
JCLWTR Release 3.0

Applied Information Development, Inc. has introduced Release 3.0 of its JCLWTR software package, which is said to include enhancements that improve its on-line search capabilities and eliminate the product's dependence on catalog operations.

JCLWTR manages the storage and retrieval of system output listings from production jobs so that there is no need to print them, according to the vendor. The software is said to also scan the output to identify errors and abnormal endings so the operation staff does not have to review each job.

Release 3.0 of JCLWTR is
See SOFTWARE page 68

And we can prove it.

We put our 1200 bps modem to the critical test. We stacked it up against Hayes, one of the "smart" modems.

The Performance

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The Reliability

Then we went inside and did a component count. The final score: Hayes 252, us 155. This can be viewed two ways: Either Hayes has a 60% better chance of developing part failure, or our modem has a 60% better chance of delivering higher reliability.

Eliminating operator risk is as important to us as eliminating errors. With our modem there's virtually no risk of electrical damage because there are no internal switches to deal with. General DataComm modems automatically select all call parameters.

The Company

The General DataComm intelligent modem is the newest product of a company that has been designing data communication systems for 15 years. A company whose customer list is a "Who's Who" of international business. Most of the Bell operating companies, and other telephone companies in the U.S. and Canada. Major banks. Brokerage firms. And many of the Fortune "500."

We build multiplexers, modems, local area and digital network products, and the most complete networking systems on the market. Now we're applying the technology that won the respect of big business and Bell to the personal computer market. With a line of 300 and 1200 bps modems and our own communications software.

The General DataComm modem. We put it to the critical test. Now it's ready for the ultimate test. Yours. To find the dealer nearest you, contact the Personal Computer Products Dept., (203) 574-1118. General DataComm, Middlebury, CT 06762-1299.

 **General dataComm**

The best connections in the business.

- VCP supports and allows CICS files
- using built-in JCL
- many other CONFIDENTIAL features
- automatic PULSE statements
- less 30-day trial period
- \$1250 one-time or \$83 month


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800 University Avenue N.E., Suite 300
Minneapolis, MN 55412
(612) 271-4400

SOFTWARE & SERVICES

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to enhance the IBM TSO/SPF interface, including data selection in the search for system outputs, new Help and tutorial screens, logic-to-by-pass screens when needed and enhanced error analysis routines. It also provides the capability to bypass catalog operations, making it compatible with installations that use IBM's integrated catalog facility, the vendor said.

JCLWTR, priced at \$12,000, operates on IBM MVS operating systems. Release 3.0 is available to current JCLWTR license holders under the vendor's extended warranty agreement.

Applied Information Development, 823 Commerce Drive, Oak Brook, IL 60521.

CGA SOFTWARE PRODUCTS GROUP, INC.

Version 7.5, Single Image Software

CGA Software Products Group, Inc. has announced Version 7.5 of its Single Image Software (SIS) for IBM OS installations.

According to a spokesman, the SIS software features three multiple systems products that enable multi-CPU users to run their operations without the problems of reserve lockouts, lack of data integrity, accidental tape erasures or multiple console management. The software is designed to simplify operations and increase productivity by adding a series of SIS options that automate various tasks.

Enhancements to SIS include an Automatic Requeue feature. When two jobs require the same data set, SIS prevents simultaneous access and loss of data integrity. The option automatically requeues the waiting job until the conflict is resolved and then resubmits the job without operator intervention. For tape management, Version 7.5 features an Automatic Reply option. If all tape and mountable disk devices are in use, the option will either cancel the waiting job automatically or keep it waiting, depending on site standards and the nature of the job.

Also added is the Shorthand Commands feature, which simplifies the operator command entry to reduce the chance of error, the vendor said. Version 7.5 of the SIS software is priced between \$9,000 and \$15,000.

CGA Software Products Group, 980 Holmdel Road, Holmdel, N.J. 07733.

IBM

Personal Banking Machine
Availability Management-Batch
Reporting system

IBM has announced the Personal Banking Machine Availability Management-Batch Reporting (PBMAM-BR) software system, designed to help banks and other financial institutions monitor the performance of IBM 4730 networks and identify potential problems with a specific 4730 for corrective action.

According to a spokesman, the system gathers data about each 4730 terminal and creates two types of reports: network and transaction. Network reports list all the 4730s in a network along with data to help financial institutions compare the performance of each terminal with the others in the network. Workstation reports provide detailed information about the performance of a specific

terminal, the vendor said.

The PBMAM-BR system runs in batch mode under IBM's VSE or OS/VS and creates reports by processing 4730 events and command responses collected by the 4730 Personal Banking Machine Network Monitor. PBMAM-BR is available for a one-time charge of \$14,000 and a monthly charge of \$950.

IBM, Information Systems Group, National Accounts Division, 1133 Westchester Ave., White Plains, N.Y. 10604.

ADVANCED TECHNOLOGY INTERNATIONAL, INC.

Maple, Super PDL

Advanced Technology International, Inc., a subsidiary of Advanced Technology Ltd. of Israel, has announced that it will begin marketing

two software products in the U.S. for IBM and Digital Equipment Corp. systems.

Maple is a protocol that is said to link IBM mainframes with IBM Personal Computers or compatible systems. Maple is said to be open-ended on both the mainframe and personal computer sides. The end user is shielded from viewing IBM CICS screens, the vendor said.

Prices are \$15,000 for IBM OS or DOS versions for each mainframe and range between \$650 and \$950 for the Personal Computer.

Super PDL is an interactive design program for DEC's VAX minicomputers under the VMS operating system that is said to feature a structured design language, design analysis facility and full documentation capability.

Super PDL is priced at \$15,000 per

DEC VAX.

Advanced Technology International, 135 W. 41st St., New York, N.Y. 10036.

THE SYSTEMS CENTER

Network Datanover MVS Release 3.0

The Systems Center has announced Release 3.0 of its Network Datanover MVS, a network application designed to distribute applications, corporate data and documents. The distribution is carried out between an IBM mainframe under MVS and a microcomputer, between two mainframes and between a mainframe and a minicomputer.

The release features checkpoint restart for data transmission and mainframe support for LUI2-type connectors, including cluster controllers, IBM 3270 data stream and coax-

Forte introduces



SOFTWARE & SERVICES

al connections.

The datastream support on Network Dataserver is said to allow mainframes to accommodate coaxial cluster controller connections.

Network Dataserver MVS Release 3.0 will be available Jan. 1 and costs \$30,000 for the first CPU at a site and \$30,000 per additional CPU. Systems Center, 2988 Campus Drive, San Mateo, Calif. 94403.

INTERACTIVE SOFTWARE SYSTEMS, INC.
ADT-Reportwriter

Interactive Software Systems, Inc. has introduced an interactive report generator for use on Digital Equipment Corp. VAX-11 superminicomputers.

According to the company, ADT-Reportwriter uses a Menu/Help ap-

proach at every level and uses its own data dictionary.

It reportedly provides users with single or multiple input data files, data record selection, new field calculation, multilevel breaks, subtotals and report totals.

Licenses for the ADT-Reportwriter range from \$1,350 to \$8,000, depending on system configuration, according to the vendor.

Interactive Software Systems, P.O. Box 27-066, Denver, Colo. 80227.

FORTE, INC.
Polyforth/32

Forth, Inc. announced its Polyforth/32 operating system, designed for use with Motorola, Inc. 68000 CPUs and Mizar, Inc.'s Mizar 9000 computer.

The multitasking, multitier oper-

ating system has no limit on users' partition size or number of users, the vendor said. Up to 32 bytes of memory and 32 bytes of disk may be directly accessed.

The Polyforth/32 system features more than 100K bytes of available user program space in the 128K-byte configuration, according to the vendor.

The operating system, Forth compiler, 68K-byte assembler, editor and programming aids are all resident in 16K bytes without overlays, the vendor said.

The Forth nucleus is delivered in programmable read-only memory, with source, electives and utilities on disk.

The price for a single license is \$3,300.

Forth, 2300 Pacific Coast Highway, Hermosa Beach, Calif. 90854.

SIGNAL TECHNOLOGY, INC.

Pace Plus

Signal Technology, Inc. has introduced a process accounting and charge-back system for Digital Equipment Corp. VAX-11 machines using the VMS operating system.

According to the company, Pace Plus tracks hardware and software use and includes a data management interface that can be used to access a mini data base of system resource information. The system reportedly allows a user to edit, retrieve and examine system resource data via on-screen forms and simple keyboard commands. It is said to include a general report writer that allows multilevel reporting on all system resources. There are up to 30 system variables, including node, account, project, user session and image, the company said.

Base price of the system is \$3,900. Signal Technology, 5951 Encina Road, Goleta, Calif. 93117.

INFORMATION SYSTEMS CONSULTANTS, INC.

Solomon Release 3.1, MRS

Information Systems Consultants, Inc. has announced Release 3.1 of its Source and Object Library On-Line Manager (Solomon) for use on large-scale Honeywell, Inc. computer systems that use both Honeywell's Goss III and/or Goss 8 operating systems.

The release provides functions such as automatic regeneration of transaction processing routine (TPR) libraries when an individual TPR is changed; recompilation of programs to include new versions of copy libraries; interfaces to other systems, especially those used with Honeywell Manufacturing System software; and on-line help and manual facilities.

The company also released an update to the Solomon Management Reporting System (MRS). MRS provides reporting functions for DP auditors, managers and operations staff on the status of each production file resident in the library. The user can create reports with different contents depending upon selection criteria specified.

The price of Solomon Release 3.1 is \$10,000, and the price of MRS is \$3,560.

Information Systems Consultants, 7816 N. 19th Ave., Phoenix, Ariz. 85021.

PRODUCTIVITY AIDS

SCHONFELD & ASSOCIATES, INC.

Ingot

Schonfeld & Associates, Inc. has announced Version 3.0 of its Ingot fourth-generation language and decision support system. Ingot runs on Data General Corp.'s MV series computers under DG's AOS/V3; Digital Equipment Corp.'s VAX-11 machines under DEC's VMS; any Apollo Computer, Inc. computer that runs under Apollo's Argus or AT&T's Unix operating systems; any Prime Computer, Inc. machine under Prime's Primos; Hewlett-Packard Co.'s HP 9000 series under AT&T's Unix; and Tandem Computer, Inc.'s Nonstop machines running under Tandem's BBO operating system.

The package uses English commands for calendar management. All See ADS page 70

disk the smarter desk

You've read about the IBM® 3270 PC. Now there's a technology that gives your existing PCs and compatibles IBM 3270 PC emulation. And more.

You can run all this concurrently: an IBM DOS session, mainframe sessions with four different hosts, and two note-pad sessions. Like IBM's machine, your PCs will do windows. You can even transfer data between windows. Save your work on diskettes. Then upload to the mainframe.

Unlike IBM's system, the Forte 3270PC™ emulator is entirely soft-loaded from diskette. With high-powered, menu-driven software. You can reconfigure the keyboard

and change screen colors or highlighting at will. For upgrades, you don't replace any PROMs. Just plunk in a different diskette.

With Forte, you won't get stuck with an obsolete or impossible-to-upgrade product. In fact, if you already own Forte PJ, just call your local distributor for a fast upgrade to the Forte 3270 PC on disk.

We're faster than IBM, too. With local screen capture. Transfer of whole files instead of single screens.

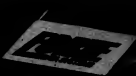
So before investing in a "smart desk," see how Forte can transform the PCs you already have into something even smarter.



FORTE
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SOFTWARE & SERVICES

AIDS

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mathematical, statistical and financial functions of Ingot can be used in conjunction with project management.

The price of Ingot licenses range from \$8,500 to \$60,000, depending upon CPU size.

Schnefeld & Associates, 2550 Crawford Ave., Evanston, IL 60201.

SIGNAL TECHNOLOGY, INC.
Smartstar Interface to RDB

Signal Technology, Inc. has announced that its Smartstar application development and data management software has been enhanced to perform as a user interface to Digital Equipment Corp.'s RDB relational data base management system.

According to a spokesman, Smart-

star offers nontechnical users a videoactive, no-programming interface for application development and data management. Command functions are assigned to a DEC VT series keypad and tied to specific video capabilities; and a user can key in design and processing commands with the keypad and see a direct real-time response on the CRT screen.

The spokesman said the videoactive attribute is said to apply across all three of Smartstar's user components — applications design and development, data updating and retrieval and general reporting. The software reportedly also supports complex applications development for more technical users and programmers. It also supports the DEC VAX/VMS RMS relational query processing facility. Smartstar is an integrated interface for both RDB and

RMS.

The extended version of Smartstar for RDB will be available in January at a price between \$9,500 and \$19,800.

Signal Technology, 5951 Encina Road, Goleta, Calif. 93117.

APPLICATION
PACKAGES

BURROUGHS CORP.

Burroughs Distribution Partner

Burroughs Corp. has announced the Burroughs Distribution Partner (BDP), a software system for manufacturers, distributors and wholesalers.

According to the company, BDP is developed with the Logic and Infor-

mation Network Compiler fourth-generation language. The product runs on Burroughs B1000, B6000, B6000 and B7000 series systems as well as the A series of mainframes. BDP modules use on-line documentation and Help screens, the company said.

The BDP Base Module includes order entry, inventory control, accounts receivable, inquiry and management reporting. Price for the Base Module on the B1000 series is \$22,500. Prices can range up to \$50,000 for the B7000 series.

Burroughs, Burroughs Place, Detroit, Mich. 48232.

GELCO PAYMENT SYSTEMS,
INC.

Travel Expense Control System

Gelco Payment Systems, Inc. has announced software that monitors and accounts for travel costs. The Travel Expense Control System (Tecs) runs on IBM IMS or CICS systems and Wang Laboratories, Inc. VS systems. A batch version is available for hardware with Asni Cobol, and an IBM Personal Computer-compatible version is also available.

Tecs verifies the accuracy of employee expense reports and bills, analyzes expense transactions from all money or billing sources, compares expenditures with the company's budget and reports on a weekly, monthly, quarterly and/or year-to-date basis.

The vendor said the price of the software is \$225/mo to lease the Personal Computer version or \$9,000 to buy it; \$36,000 for the CICS version; \$48,000 for the IMS version; \$25,000 for the Wang VS either batch or on-line versions; and \$25,000 for other batch systems.

Gelco Payment Systems, P.O. Box 18068, Minneapolis, Minn. 55416.

ABSOLUT SOFTWARE
Software for 3B2 and 3B6

Absolut Software has announced that it has ported its order entry/inventory/accounting software to run under AT&T's 3B2 and 3B6 computers.

According to a spokesman, the C language package is designed for use by distributors, wholesalers, chain retailers, direct response marketers and distributing manufacturers.

The single-user version of the order entry/inventory/accounting software licenses for \$2,995, and a version supporting up to four users licenses for \$4,995.

Absolut Software, 8001 Beacon St., Boston, Mass. 02146.

DATA I/O CORP.
Abel 1.1

Data I/O Corp. has announced a computer-assisted estimating software tool that reportedly develops logic designs for programmable logic devices.

According to the company, Abel 1.1 supports more than 96 logic devices, including Monolithic Memories, Inc.'s Megapal and logic devices from Cypress Semiconductor and VLSI Technology, Inc.

The product is available for the IBM Personal Computer with the PC-DOS operating system and the Digital Equipment Corp. VAX-11 computer with VMS or AT&T's Unix operating system.

See PAGE 74



imagine

Imagine™. Expand the way you think about information retrieval. It's the only query and reporting system built for CICS with: Entirely menu-driven architecture • Integrated on-line and batch query and report writing • Comprehensive system-managed control of CPU resources and data security • Integration of production files into an on-line informational data base. For more information, call (617) 547-8050.

MULTIPLICATIONS *

UNICEL has selected Imagine for use with its application software products. Multiplications has offices in the following locations: Cambridge, MA, Atlanta, GA, New York, NY, Oakland, CA, Rochester, NY, Toronto, ON.

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**DIGITAL
BRINGS VAX
TO LARGE
SCALE
COMPUTING.**



INTRODUCING THE VAX 8600 SYSTEM.

Your applications can do exactly what you want them to on Digital's new VAX™ 8600 computer system. They can expand.

User population can increase. Scientific problems can become more complex. Transaction volume can intensify. And data storage requirements can grow exponentially.

The VAX 8600 system gives you unprecedented capacity for applications growth. It's the first of a new generation of large scale VAX processors, with memory expansion to 32 million bytes and online storage up to 160 billion bytes. Yet the VAX 8600 system maintains complete architectural compatibility with every other VAX processor — including the new desktop-size

MicroVAX I™ system. Every system in the family gives you the same VMS™ operating system software, with the same set of proven development tools, communications options and data management facilities. Quite simply, there's not another computer family in the world that can match the growth path you get with Digital's VAX systems.

YOU GET UP TO 4.2 TIMES THE PERFORMANCE.

We've engineered the VAX 8600 system to deliver more than four times the processing speed and performance that the industry-standard VAX-11/780 system is known for. We've achieved this performance increase

through the use of ECL gate array technology and several advanced engineering techniques.

Specifically, the VAX 8600 system incorporates four-stage pipelined processing that increases throughput by allowing the system to execute one instruction while it simultaneously decodes a second, generates an address for a third and

fetches a fourth. There's also a floating point accelerator that speeds floating point operations.

Even with all its power, the VAX 8600 system conserves floor space. The CPU fits into the same size cabinet as the VAX-11/780 CPU. Power consumption and air conditioning requirements are similar, too.

VAX 8600 SYSTEM HIGHLIGHTS

MAXIMUM MAIN MEMORY SIZE 32 Million Bytes
MAXIMUM STORAGE CAPACITY 160 Billion Bytes
MAXIMUM COMMUNICATION LINES 512 plus Local and Wide Area Networks
PROGRAM ADDRESS CAPACITY 4 Billion Bytes
BUS SUPPORT Availability includes UNIBUS,™ 2SBI, 4 DR 780, 3 CI and 4 MASSBUS™
PHYSICAL DIMENSIONS 60 1/2" x 73 1/4" x 30"
POWER CONSUMPTION 6.5 KW (10 KVA)
AIR CONDITIONING REQUIREMENTS 22,200 BTU/hr
ACOUSTIC LEVEL 50 dBA

VAXCLUSTERS LET YOU SHARE THE WEALTH OF VAX RESOURCES.

The large-scale storage and multi-user support you get with Digital's VAX 8600 system can be increased many times over with VAXcluster™ systems. This

ter using a VAX 8600 system as a compute server.

The wealth of resources available to all VAX systems includes VAX Information Architecture, which offers a CODASYL-

agement utilities to work with. You have a choice of 15 programming languages. And you can combine different languages in a single application through the common calling standard.

the SNA™ gateway.

The VAX 8600 system is engineered for the reliability your large-scale applications require. Self-diagnostic intelligence simplifies maintenance.

BEST ENGINEERED MEANS ENGINEERED TO A PLAN.

The VAX 8600 system, like all Digital hardware and software products, is engineered to conform to an overall computing strategy. This means our systems are engineered to work together easily and expand economically. Only Digital provides you with a single, integrated computing strategy direct from desktop to data center.

For a brochure on the VAX 8600 system, contact your local Digital sales office. Or call 1-800-DIGITAL, ext. 280.

THE BEST ENGINEERED COMPUTERS IN THE WORLD.

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multiprocessing capability, which is unique in the industry, lets you combine the resources of several VAX processors and manage them as a single system. VAXcluster systems enhance data integrity and increase system availability, with complete user transparency.

VAXcluster systems can be configured with up to 16 processors and storage servers in a variety of combinations. You can boost computing power in an existing VAXcluster configuration by adding a VAX 8600 system. Or you can build a new VAXclus-

compliant database - VAX DBMS, and a relational database - Rdb/VMS. This software, together with the RMS hierarchical file manager which is part of the VMS operating system, can all use the DATARETRIEVE™ user-friendly query language. And they all benefit from a Common Data Dictionary that eliminates data redundancy and permits record-, field- and user-specific security controls. What's more, you can automate your office with Digital's ALL-IN-1™ software.

All VAX systems give you a complete set of program debuggers, editors, and screen man-

ENGINEERED FOR COMPATIBILITY AND RELIABILITY.

Digital's VAX 8600 system is compatible with every other VAX processor. It can also work with many other systems you may already own. Digital's DECnet™ networking software links Digital systems, users, files and applications over a variety of communication devices, such as Ethernet, leased lines, standard telephone lines, and public wide area networks. We offer protocols for communication with non-Digital environments, such as

SOFTWARE & SERVICES

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Abel 1.1 includes an equations-reduction algorithm and is said to minimize reduction time by using separate algorithms optimized for each type of device. During processing, Abel reportedly reduces design equations pin-by-pin and identifies each equation on the CRT by the output pin it represents.

Abel 1.1 for the IBM Personal Computer sells for \$895; versions on the DEC VAX-11 sell for \$2,495.

Data I/O, 10585 Willow Road N.E., Redmond, Wash. 98073.

META SOFTWARE, INC.
DRG Optimizer

Meta Software, Inc. has announced a software package said to help hospitals meet the record-keeping and reporting requirements of the U.S. government's Medicare Diagnostic Related Groupings (DRG) reimbursement program.

The DRG Optimizer is an expansion of the vendor's DRG Grouper, DRG Reanalyzer and Ad Hoc Report Generator software. The DRG programs are part of the vendor's Charms hospital software packages for managing medical records and utilization review.

The DRG Optimizer is said to assist in the computation of DRG by validating the assignment on the basis of the clinical data in the patient's record. It computes the DRG rating for each discharge diagnosis recorded as if it were the principal diagnosis, the vendor said.

DRG Optimizer runs on IBM 370, 4000 and 30 series mainframes in IBM's OS, DOS and PCS operating environments. DRG Optimizer costs \$8,000 when purchased with the vendor's Charms records package.

Meta Software, 1860 Broadway, New York, N.Y. 10023.

LANIER BUSINESS PRODUCTS, INC.**Textway**

Lanier Business Products, Inc. has announced Textway, a product that formats files created on a Lanier No-Problem or Typewriter word processor for use on Lanier's Business Processor.

The product converts embedded commands, format settings and data so that the user does not have to clean up or retype any information, Lanier said. The product reportedly works at a speed of 400 word/min.

Textway is menu-driven and consists of a hard-disk interface board and a utility program.

It costs \$695, the vendor said.

Lanier Business Products, 1700 Chestnut Drive N.E., Atlanta, Ga. 30324.

CIE SYSTEMS, INC.
Payroll/680

A payroll accounting software package said to provide multicompany and multistate accounting capabilities, as well as reports and listings that produce an audit trail, has been introduced by CIE Systems, Inc.

Payroll/680 is available for the CIE 680 family of multiuser business computer systems. According to the company, the package in-

cludes a year-end closing program, federal, state and local tax table maintenance, union file maintenance and reports and tax deposit history. Workers' compensation calculations, check histories, adjustment programs, union transaction flexible data entry and user-defined categories are also included, the company said.

The product is priced at \$995.

Cie Systems, 2515 McCabe Way, Irvine, Calif. 92713.

DIGITAL EQUIPMENT CORP.
VAX Decrad V2.0

Digital Equipment Corp.'s Medical Systems Group has announced enhancements for its VAX Decrad application package for use in hospital radiology departments.

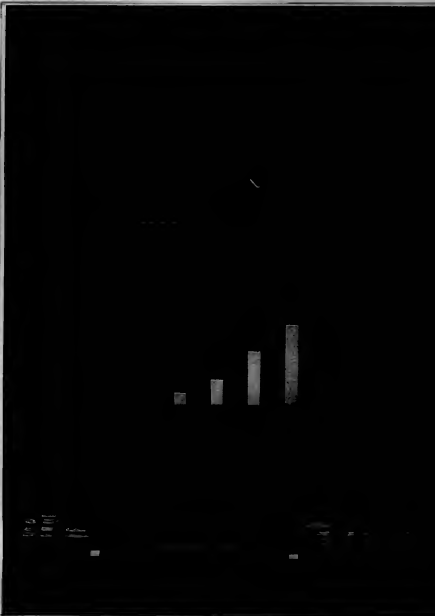
VAX Decrad V2.0, which runs on DEC VAX-11/760, VAX-11/780 and VAX-11/786 processors, reportedly was developed with the assistance of the Radiology In-

formation System Consortium, a nationwide group of medical centers. It may stand alone or network with other information systems.

Features are said to include increased functionality and throughput in transcription, scheduling, patient tracking, film library management and management report production.

Scheduled for delivery in March, it costs \$36,500.

DEC, Maynard, Mass. 01754.



SOFTWARE & SERVICES

DATA BASE
MANAGEMENT
SYSTEMSSPERRY CORP.
Voice Response Support
Package

Sperry Corp. has announced the Voice Response Support Package, which is said to provide telephone access to Sperry mainframe data bases.

According to a company spokesman, the Voice Response Support Package is an enhancement to Sperry's Voice Information Processing System (Vips). It integrates Vips with a Sperry Series 1100 host computer and allows users to interrogate a Series 1100 data base, guided by voice prompts, through any Touch-Tone telephone. The system also allows for concurrent execution of multiple applications.

Under the Series 1100

host, a user-defined vocabulary of words, phrases or prompts can be created to guide the telephone user in retrieving or entering data to the host-based applications. The controlling applications programs are based on Sperry's Mapper system. The Voice Response Support Package supports such applications as on-line order entry, data collection, information retrieval, status reporting and information inquiry and updating, accord-

ing to a vendor spokesman.

The spokesman said the package acts as an intelligent controller for the telephone and the telephone network, making the Touch-Tone telephone a controlled-access data terminal linked to the host computer. The voice vocabulary needed to guide the user is created and stored using the telephone, and a command language instructs the user to make inquiries or enter information from the telephone.

Pricing for Vips with the Voice Response Support Package ranges from \$134,000 to \$217,000, depending on configuration, Sperry said.

Sperry, Computer Systems, P.O. Box 500, Blue Bell, Pa. 19424.

BUSINESS CONTROLS
CORP.

Report Builders-I

Builders Controls Corp. (BBC) has announced a report writer that produces either Basic or Cobol compiler code.

Report Builders-I (RB-I), for Digital Equipment Corp. VAX-11 systems, works with all standard RMS files. It reportedly uses the common data dictionary for data definitions.

The vendor said using the RB-I menu system and the on-line Help facility, the user can create a report specification file for each report. Report name, author, users, control breaks, subtotal fields, sort fields, page and line breaks can all reportedly be included in the report.

The RB-I is priced at \$4,500 for the first system and \$3,000 for each additional system.

Business Controls, 3-7 W. First St., Clifton, N.J. 07011.

SOFTSYSTEMS, INC.

Journal Processing Utility

Softsystems, Inc. has introduced its Journal Processing Utility (JPU), a tool for recovering lost data for IBM Vsam files and IBM DL/I data bases operating within an IBM CICS environment under either IBM's DOS/VSE, OS/VS1 or MVS operating systems on IBM mainframe computers.

JPU provides forward recovery capabilities by allowing the user to select all or specific Vsam file and/or DL/I data bases to be processed against the CICS Journal. JPU also has backup, print, copy and user exit capabilities.

A permanent license for DOS sites is \$3,800 and \$4,500 for OS sites. The price includes one year of maintenance.

Softsystems, 311 Mallick Tower, One Summit Ave., Fort Worth, Texas 76102.

See **ENR** page 75

YOUR TWO FAVORITE COMPUTERS NOW HAVE ONE THING IN COMMON. YOUR FAVORITE GRAPHICS TERMINAL

Introducing the new CX4100 Series of Tektronix high performance, yet affordable color graphics terminals. Now you can have the Tektronix PLOT 10 graphics command set you've always wanted while you use the host of your choice, IBM or DEC. Just by typing a single

IBM-style keyboard. Plus Tek enhancements: individual key programmability, user-selectable ten-key pad, and joystick for quick cursor movement and graphics input.

Screen output will be just as familiar as keyboard layout. 32-line 3278/3279 alphanumeric emulation is built in. And so is full support for the 4657 Graphics Tablet, plus full hard copy and transparency output to a full range of Tektronix Color Graphics Copiers and the 4510 Color Graphics Plotter.

Real flexibility is matched by DEC flexibility. In RS-232 mode, the terminals can run all VT100 applications through the extended ANSI X3.64 command set. In addition to the host interface port the terminals also rates up to 38.4k baud. CX terminals are provided with two additional RS-232 ports and a Centronics-style parallel port for connecting a wide range of peripherals.

Familiar 3270 IBM-style alphanumeric output is fully emulated on all CX4100 terminals. Enhanced IBM-style keyboard is part of the package.

"switch-host" command. Tek's CX4100, CX4107 and CX4109 are all directly plug compatible with both host environments. One cox to a standard IBM 3270 controller is all you need or one RS-232 connection to your DEC system.

To make your use of existing or new graphics data fast and friendly, the CX Series comes with an

Tek's all new precision ink jet 4692 color copier produces very high quality full color transparencies or hard copy

That's software investment protection—matched by technology protection. CX terminals feature a 60 Hz non-interfaced display with 4096 x 4096 addressability displayed in a 640 x 480 matrix. 16 colors, eight line styles, 11 marker types, rapid area fill, local-rotatable text, complete segment support, true zoom and pan, and separate dialog area. It's all there with the full PLOT 10 command set.

So don't wait. Set the best of three worlds on one desk: TEK, DEC, and IBM. Contact your local representative today for information on the CX4100 Series. Call 1-800-547-1512. In Oregon 1-800-452-1877.

Tektronix
MAKING THE WORLD WORK BETTER



SOFTWARE & SERVICES

PACKS from page 75SIR, INC.
SIR/DBMS

SIR, Inc. has announced that its SIR/DBMS relational data base management system is now available for Hewlett-Packard Co.'s HP9000 Series 500 machines running under HP's HP-UX operating system.

The package was specifically designed for analytical uses in business, industry, science and research, according to the vendor.

Included in the package is SQL+, the company's expansion version of IBM's SQL.

Also included in the package are the Forms feature for interactive screen-oriented data entry and query by forms; Host, an interface for access to one or more SIR/DBMS data bases; Help, for on-line documentation and user assistance; and Graph, for production of business and scientific graphics.

The price of the SIR/DBMS package for HP 9000 Series 500 machines is \$6,000 for a single-user initial annual license fee.

SIR, Suite 400, 820 Davis St., Evanston, IL 60201.

DIGITAL INFORMATION
SYSTEMS CORP.

Version 4, DBL for Unix

Digital Information Systems Corp. has announced that its Data Business Language (DBL) now runs under the AT&T Unix operating system.

According to the company, Version 4 of DBL has the ability to chain to non-DBL programs and to interface to subroutines written in other languages.

Multitask IBM Isam files, full screen programming functions, a fixed-point decimal data type and a symbolic debugger are all said to speed development time.

Pricing starts at \$449 for personal computers and ranges up to \$3,549 for superminicomputers, according to the vendor.

Digital Information Sys-

tems, Suite 340, 3336 Broadway Road, Sacramento, Calif. 95827.

AMDAHL CORP.

Ingres under Unix on Amdahl mainframes

Amdahl Corp. has announced that it has entered into a joint marketing agreement with Relational Technology, Inc. to offer that company's Ingres relational data base management system under UTS, Amdahl's

version of the AT&T Unix operating system.

Relational Technology has an early installation program for the UTS-based Ingres system under way and is said to view its customer base, which includes more than 700 installations, as prospective users of the new software.

According to the agreement, Relational Technology will license the program directly. A supported license for

the product is priced at \$80,000.

Amdahl, 1250 E. Arques Ave., Sunnyvale, Calif.

LANGUAGES

COMPLETE SOFTWARE,
INC.
Cdebug

A menu-driven C language source-level debugger that

operates independently of its host has been introduced by Complete Software, Inc.

Cdebug is an interactive tool that symbolically debugs source code routines written in C, according to the vendor.

The program uses its own preprocessor to incorporate symbol tables into source code and a runtime library to compile and link programs.

The software operates on Digital Equipment Corp.'s VMS operating systems, Bell Laboratories' Unix 4.1, 4.2,



SOFTWARE & SERVICES

III and V versions and IBM's PC-DOS for the IBM Personal Computer, according to the vendor.

The company said the product examines and modifies all C elements by name and types.

Depending on the number of users, Debug ranges in price from \$300 for personal computers to \$3,000 for a VAX-11/780.

Complete Software, 60 Aberdeen Ave., Cambridge, Mass. 02135.

IBM VS Fortran Interactive Debug Release 2

IBM has announced Release 2 of its Interactive Debugger for VS Fortran running on IBM mainframes.

Enhancements include:
■ Debugging of VS Fortran programs compiled by VS Fortran Release 2 or later in IBM's MVS/XA environment. When linked to the Release 4 VS Fortran library, debugging of 31-bit address-

ing mode is supported.

■ Debugging of programs compiled with the VS Fortran Release 4 compiler except those compiled with the reentrant option.

■ Added task-type Help panels to aid in debugging 31-bit addressing mode programs under MVS/XA.

Initial licensing is \$1,800 with a \$300 monthly charge. IBM, National Accounts Division, 1133 Westchester Ave., White Plains, N.Y. 10604.

PERKIN-ELMER CORP. Sibol

Perkin-Elmer Corp. has announced that the Software Ireland, Ltd. Sibol language system is now available for its Everyware family of computer systems, ranging from the desktop PE 7360 supermicrocomputer to the Series 3200 family of supermini-computers. The package runs with PE's Xelos and Unisoft Corp.'s Uniplex+ operating systems.

Sibol is an implementation of Digital Equipment Corp.'s Dblol business-oriented language.

The Sibol compiler allows Dblol programs to be written on PE's hardware systems, as well as allowing existing applications written in Dblol to be recompiled and run on the PE systems.

The Sibol system consists of a compiler, a linker, a runtime interpreter and a library of external utility subroutines.

Sibol licenses start at \$750 for the PE 7360 and \$1,250 for the entry-level PE Model 3206. Full documentation is included.

Perkin-Elmer, Data Systems Group, Two Crescent Place, Oceanport, N.J. 07757.

ADVANCED COMPUTER TECHNIQUES CORP. Fortran 77 compiler

Advanced Computer Techniques Corp. has announced a version of its Fortran 77 compiler that targets the MIL-STD-1760A chip set.

Programs are written on Digital Equipment Corp.'s VAX-11 series computers under Digital Equipment Corp.'s VMS operating system to run on MIL-STD-1760A chip-set-embedded computers. This version of the compiler will generate the MIL-STD-1760A assembler code output.

The package is consistent with the Ansi X3.9-1978 for full Fortran 77, according to the vendor.

The military standard extensions to the Fortran 77 language, MIL-STD-1763, are also featured in the product.

Machine-independent optimization techniques for code generation are said to include invariant code movement, strength reductions, constant folding and common subexpression elimination.

The price of the source code is \$170,000.

Advanced Computer Techniques, 16 E. 34th St., New York, N.Y. 10016.

COMPUTER THOUGHT CORP. Ada Interpreter/Debugger

Computer Thought Corp. has announced an Ada language interpreter and interactive, source-level debugger. The software is available for Symbolics Corp.'s Symbolics 3600 workstation in Symbolics' Zetallap environment.

The interpreter supports all major Ada language features and is fully integrated with the interactive debugger, which allows programmers to diagnose errors at the source-code level. Both interpreter and debugger use windowing techniques and support the use of a mouse to select commands.

The license fee for the Ada
See TML page 78

Cityscape in alternative energy: solar, wind and geothermal technologies are applied to maximize energy efficiency. Solar panels form windpipes which rotate parallel to direct surface; temperatures of air and water supplies are maintained by flows through buried conduits.

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DTA

TALK

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Interpreter/Debugger is priced at \$15,000 for the first workstation and \$10,000 for up to four workstations. Subsequent workstations cost \$7,500.

Computer Thought, Suite 185, 1781 W. Plano Pkwy., Plano, Texas 75075.

UNISOFT SYSTEM CORP.

Pascal-2 for Uniplus+

Unisoft System Corp. has

announced the Pascal-2 compiler, developed by Oregon Software, Inc. for Unisoft's Uniplus+ Unix-based operating system.

According to a spokesman, the Pascal-2 compiler performs eight types of code optimization. Pascal-2 programs can call subroutines written in C or Assembly, allowing the user to take advantage of existing Uniplus+ software.

Pascal-2's language extensions provide input and out-

put handling and can gain access to low-level operations.

Program development tools include a high-level interactive debugger, an execution profiler and other utilities to aid in coding and development. The compiler is said to support all capabilities of standard Pascal and conforms to level one of the international Pascal standard.

Pascal-2 for Uniplus+ systems is licensed for \$1,000.

Unisoft, 739 Austin Way, Berkeley, Calif. 94710.

POTOMAC SYSTEMS RESOURCES, INC.

RM Cobol for Masscomp systems

Potomac Systems Resources, Inc. has announced the availability of Ryan McParland Corp.'s RM/Cobol for Masscomp's line of real-time, multiuser microcomputers.

The language is available from Potomac Systems Resources at a cost of \$3,780 per user.

Potomac Systems Resources, P.O. Box 5510, Reston, Va. 22091.

REMOTE COMPUTING SERVICES

GENERAL ELECTRIC INFORMATION SERVICES CO.

Softman

General Electric Information Services Co. (Geisaco) has introduced Softman, an electronic software management and distribution system, to its time-sharing network.

Softman reportedly can be used to coordinate and control the distribution of personal computer software in an organization. It reportedly can also be used to distribute proprietary software including programs, files, messages and spreadsheet templates.

Distribution under Softman reportedly can either be limited to the U.S. only or worldwide. It is said to consist of a module for system administrators on the Geisaco Mark III Service and an end-user module for each micro.

Softman is priced at \$100 for the end-user package, plus a charge for each download, typically \$6 to \$24.

Geisaco, 401 N. Washington St., Rockville, Md. 20850.

ADP NETWORK

SERVICES, INC.
Savings and Loan data base update

ADP Network Services, Inc. has released an updated version of its Savings and Loan data base, containing balance sheet and income statement information on more than 4,000 U.S. savings

Oh, the joys of being a DP professional.

Every job has its share of problems. But DP professionals seem to be blessed with more than their fair share.

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Triangle Software Company

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San Jose, CA 95129

SOFTWARE & SERVICES

and loan associations. The service is primarily accessed through ADP's Screen software but can be accessed through ADP's Datapath or through Fortran subroutines.

The update reflects recent, major modifications to the format and frequency in which savings and loan associations are required to report their financial positions to the Federal Home Loan Bank Board, the vendor said. Quarterly information is now provided.

The price of the system is transaction-based and depends on resources used and length of time on the system.

ADP Network Services, 175 Jackson Plaza, Ann Arbor, Mich. 48106.

BANK EARNINGS INTERNATIONAL, INC. INNERLINE, INC. Peer Group

Bank Earnings International, Inc. (BEI) and Innerline, Inc. have announced the Peer Group, an on-line, IBM Personal Computer-based service that allows banks anonymously to compare their performance to that of competing institutions.

Using BEI's Executive Manager Personal Computer Software, a spokesman said, the Peer Group allows banks, bank holding companies and savings and loan companies to upload financial and operational data to Innerline's on-line financial information network. Innerline will compile client data and create a variety of comparative financial reports that will then be downloaded to customer personal computers.

The Peer Group is said to provide nationwide analysis capabilities based on asset size, branching, location and in-house data processing vs. non-DFP institutions. Financial and operational data will be available on-line within 48 hours of receipt.

A one-year subscription to the Peer Group service is currently priced at \$3,600, with discounts available for multiple subscriptions, a spokesman said.

Innerline, 10 W. Algonquin Road, Arlington Heights, Ill. 60005.

COMPUTER SCIENCES CORP. Media-Cal claims service

Computer Sciences Corp. (CSC) has announced that medical billing firms and health care providers in California can now enter and validate Medi-Cal claims data on magnetic tape into the automated claims processing system that CSC operates for the California Department of Health Services.

CSC can process claims submitted on magnetic computer tape on the same day they are received and send more than 90% of them on to the State Controller's Office for payment on the following Monday, CSC said.

Computer Sciences, 650 N. Sepulveda Blvd., El Segundo, Calif. 90245.

ON-LINE DATA BASES

VM SYSTEMS GROUP, INC. Electronic bulletin board

VM Systems Group, Inc. has introduced an electronic bulletin board for users of systems operating under IBM's VM operating system.

V/Net can be accessed by users with a 300 bit/sec Ascl terminal, a

telephone and a V/Net user identification number supplied by the vendor. The bulletin board will enable users to exchange information about VM installations and products.

V/Net is free, except for the cost of the phone call, to all VM sites, those planning to install VM and to other persons or institutions upon request, the vendor said.

VM Systems Group, Suite 515, 2300 S. Ninth St., Arlington, Va. 22204.

PREDICASTS, INC. Prompt data base for ADP Network Services

Predicta, Inc. has announced that its Prompt data base is now available through ADP Network Services.

Prompt contains abstracts of more than 400,000 business-related articles published since 1980 from more than 1,600 publications.

Information from Prompt can now be used in conjunction with numeric, financial and economic data available through ADP, Predicta said.

Prompt incorporates ADP's Screen, a text searching software package through which users search, retrieve and display information from ADP's data bases. By entering key word qualifiers, users can identify the companies, industries, markets or technologies they want to study.

The service is accessible through ADP's Datapath, a data access software package used with the IBM Personal Computer and Lotus Development Corp.'s 1-2-3. With Datapath, users can download information from Prompt to Personal Computers.

ADP charges \$15 for a 300 bit/sec connection or \$30 for a 1,200 bit/sec connection. In addition, customers are charged \$225 for each abstract accessed.

Predicta, 11001 Cedar Ave., Cleveland, Ohio 44106.

INNERLINE, INC. Savings Institution Performance Index

Innerline, Inc. has introduced Sav-

ing Institution Performance Index, an on-line service that gives savings and loan institutions the opportunity to compare and evaluate their own and their peers' financial performance.

The service compares information on all insured institutions nationwide based on balance sheets, income statement data and 71 performance ratios derived from call reports filed with the Federal Home Loan Bank System, according to the vendor.

Executives can use the index to determine market share or examine possible merger and acquisition candidates, the vendor said. The index reportedly provides four report formats, including the Individual Institution Report and the Comparative Report.

Connect-time costs range from \$30 for 20 minutes each month to \$300 for 515 minutes a month. The surcharge ranges in price from 54 cents to 50 cents per minute.

Innerline, 95 W. Algonquin Road, Arlington Heights, Ill. 60005.

SST, INC. Handshake Coll

SST, Inc. has unveiled a software package that reportedly provides a direct link between AT&T Unix-based minicomputers and microcomputers and the full range of Western Union Corp. services including Telex, Telegram, Cablegram, Computer Letter and Mailgram.

Called the Handshake Computer Linked Telex (Coll), the software is now available for the Fortune Systems Corp. 3216 desktop computer. According to the vendor, the product allows the user to send and receive a variety of electronic communications over a terminal. The user can perform routine tasks while messaging takes place concurrently and transparently, the vendor added, without interrupting applications. Handshake's capabilities are said to include automatic answer and send, text editing, message log with auditing and the ability to send a message as a preprogrammed, specified time.

The price of Handshake is \$850 for a single CPU.
SST, 9434 N. 107th St., Milwaukee, Wis. 53224.

VM SYSTEMS GROUP, INC. V/Net

VM Systems Group, Inc. has introduced V/Net, an information exchange service for users of IBM's VM operating system. To log on to V/Net, users must have a 300 bit/sec Ascl terminal, a telephone and a V/Net user identification.

V/Net users can ask questions about VM, receive other users' advice, look through files, add information or create a file for which link is desired.

This electronic bulletin board service is free, but the user must contact VM Systems Group to request a user identification.

VM Systems Group, Suite 515, 2300 S. Ninth St., Arlington, Va. 22204.

METHODOLOGIES

M. BRYCE & ASSOCIATES, INC. Release 7 Pledge-Automated System Design Methodology

M. Bryce & Associates, Inc. has announced enhancements to its Pledge-Automated System Design Methodology program that are said to improve its speed, performance and ease of use and to upgrade the product's documentation.

Release 7 is said to include an interactive facility that replaces four previous modules: search data base, interactive component display, interactive data entry and interactive display. The purpose of the subsystem is to provide a complete interactive environment in order to display, enter, search and reference systems component information that resides in the product's Information Resource Manager, the vendor said.

Release 7 also includes enhancements to the product's Automated In-

Continued on page 84

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SOFTWARE & SERVICES

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ence only those data elements with which it is concerned. As subsystems are added, the schema and the sub-schemas are changed; there should be no need to modify or rewrite the programs of prior completed subsystems.

It is a shame that most organizations do not take full advantage of this device to achieve and maintain data independence. Instead, the sub-schemas is usually structured to be a mirror image of the schema. As a result, the programmer is forced to perform detailed data base navigation and thereby lock the programs to the physical structure of the data base.

One of the common misuses of a DBMS is to perform data base navigation in the program coding. In practice, data base navigation should

be avoided at all costs.

Data base navigation is a technique for retrieving records from the data base. For a multistep record structure, it involves reading each segment at a given level in sequence and then explicitly using the pointers to the lower segment to retrieve the lower segment records. At each level, checking the data base status is necessary to ascertain whether the end-of-chain for a given segment level has occurred.

Masking the best alternative

The best alternative is to use the DBMS' capabilities to mask the physical structure of the data base from the programmer. Most, if not all, of the currently popular DBMS include this capability, which is generically a component of subschema definition.

Through the subschema, the

DBMS keeps track of whether end-of-chain has occurred on each level and retrieves the next data base segment for a lower level. Almost all DBMS are smart enough not to re-retrieve a segment that is already available.

The advantages of this programming technique are numerous. First, the program is considerably more readable. Second, the data base record appears as a flat record, allowing the processing techniques used with flat records to be employed.

The greatest advantage of this technique is that the program is now oblivious to the physical data base structure. Fields can be added or deleted, broken into more segments or combined. After making the appropriate changes to the subschema, the program will almost never have to be modified for segment arrangement

changes. Any program that uses a field that was deleted, or which must use a field that is being added, will have to be modified.

The major objection to this technique is that performing the detailed data base navigation in the program is more efficient. This premise is incorrect and leads to false economics. The subschema definition is a program that performs all the segment retrievals and status checks that the programmer would perform. A subschema generator would be optimized to the DBMS and the machine on which it runs. As a result, in most cases, letting the DBMS retrieve the segments is more efficient than the code produced by a high-level language.

More important is the fact that the programmer must code and debug the detailed logic in each program. Furthermore, if unnecessary program changes are required because of data base structure changes, the value of the programmer's time will far exceed the value of the machine time expended on any data base inefficiencies.

Another area where we fail to take advantage of the power of the DBMS occurs when one accesses specific records using selection criteria. This occurs for two reasons. First, in much the same way as sequential access, there is a strong desire to instruct the DBMS on how to find the desired record. Second, there is an attitude that all or nearly all of the fields that will be used as selection criteria must be either segment keys or secondary indexes.

In both cases, it is better to treat the data as flat records and to access the records by specifying the fields to be selected and the desired values. Then let the DBMS analyze the resources that are available, such as segment keys and secondary indexes, and choose the most efficient means of accessing the desired record.

Multistep process typical

A typical manner in which specific records on a data base are accessed is to employ a multistep process. The first step is to direct the DBMS to use a specific secondary index to retrieve one of the segments of the desired record. The second step involves issuing unique retrieval requests that specify any of the selection criteria that happen to be segment keys. If the selection criteria includes any nonkey fields, a sequential search loop is constructed to locate the specific record.

All fields that are involved in the selection criteria should be specified in a retrieval request, regardless of whether an index or key exists for them. It should be left to the DBMS to determine what facilities are available and to use those facilities in an optimal manner. This also leaves the greatest opportunity to take advantage of key and index facilities if they should become available.

It is possible to place the system, using this coding technique, into production with the intention of optimizing the access facilities at some later time. This would be done by monitoring the data usage and selection patterns. When it seems appropriate, one can devise a new schema, modify the subschemas if necessary and then reorganize the data base itself.

In his next article, Ruggers will discuss a method to build a major system using subsystems.

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The key word in that long, drawn-out headline is system.

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And both have DSN/Link, to let you set up a direct line of communication between them and your HP 3000 Department Computer.

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At 300 characters per second, our LaserJet printer is even faster.

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and when you get to your hotel, change everything.

Two different plotters are also part of the HP personal computer system.

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**HEWLETT
PACKARD**

SOFTWARE & SERVICES

Continued from page 79

structional Materials that contain narratives and instructions for executing all tasks associated with systems design, data base design and project management.

The product runs on a variety of minis and mainframes from IBM, Digital Equipment Corp., Honeywell, Inc., Sperry Corp. and NEC Corp. The price is \$80,000.

M. Bryce & Associates, 1248 Springfield Pike, Cincinnati, Ohio 45215.

SPECTRUM INTERNATIONAL Spectrum/Prototyping

Spectrum International has announced Spectrum/Prototyping, a manual system development package that allows users to design a prototype of an application before building a complete system.

The written development methodology enables a manager to estimate the scope of a project before beginning

the actual work, according to the vendor. Spectrum/Prototyping allows a user to create models by providing tasks, estimating guidelines and constructing examples that can be used in a working model, Spectrum International said.

The methodology is said to provide step-by-step project guidance, establish project criteria, develop preliminary design and conduct periodic evaluations.

Spectrum/Prototyping

costs \$10,000.

Spectrum International, Suite 150, 8101 W. Centinela Ave., Culver City, Calif. 90230.

TRAINING

CREATIVE APPROACHES, INC.

Training for IBM IMS, CICS, TSO and CMS

Creative Approaches, Inc.

has introduced IBM mainframe-based software for teaching and users the fundamentals of data entry for any IBM IMS, CICS, TSO or CMS application. The course runs on any IBM mainframe under IBM's Interactive Instructional Presentation System.

The course is customized to any one of the client's application screens, the vendor said. It provides exercise screens so the student can master concepts such as cursor placement, tabbing, function keys, error messages and problem resolution.

The course is priced at \$1,200 plus an hourly charge for customization. The typical cost is \$4,000.

Creative Approaches, 8 Prince St., Rochester, N.Y. 14607.

MENTOR RESOURCES, INC.

Taskmaster

Mentor Resources, Inc. has announced an on-line interactive training system for users of Wang Laboratories, Inc. VS operating systems.

Taskmaster reportedly allows users to design their own training programs. The program is said to allow students to interact with VS features through simulation activities.

Course titles are "Command Processor," "Operator's Console," "Backup," "WF Administration in a VS Environment," "Disk Space Management," "VS Problem Resolution," "Configuration Management" and "Communication Concepts."

Courses are available for \$500 and are sold on a per-CPU basis.

Mentor Resources, One Tara Blvd., Nashua, N.H. 03062.

OXFORD SOFTWARE CORP.

Video Training Tape for Maxicalc II

Oxford Software Corp. has announced a full color, video training tape to tutor users on the most recent release of Oxford's Maxicalc II IBM CICS-based spreadsheet package. The tape is available in 1/2-in. VHS, 1/4-in. Beta or 1/4-in. video formats and is accompanied by a Maxicalc II reference card.

The tape is one hour long and teaches users how to sign on to Maxicalc II; build a simple workbook with three worksheets; modify, format and print work sheets; generate and display full color graphics; and sign off from the package.

The price of the Video Training Tape is \$200 for the first tape and \$150 for each additional tape. It is available to those organizations having a license agreement for the product.

Oxford Software, 174 Bow' levard, Haverbrook Heights, N.J. 07604.

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How is portability achieved? cENGLISH through its compiler interface translates cENGLISH into documented C source and uses a host C compiler to produce native machine code.



C source can be embedded in cENGLISH source.

Differences in the operating system and data base manager are handled by the runtime libraries.

The result is that cENGLISH source can be compiled without modification on any micro or mini configuration supporting cENGLISH.

What about performance? cENGLISH executes FAST, just like any compiled C program.

How easy is cENGLISH to use? While cENGLISH is a powerful high level language that can accommodate complex software development, it remains simple and straightforward to use.

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Data Base Managers:

C-ISAM™ and INFORMIX, UNIFY, ORACLE, PHACT, Logix™

Foreign Language Versions:

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Attention MS/DOS users. Demo version and special introductory offer available for IBM PC, XT, AT, and other MS/DOS systems.

Requirements: 256K, hard disk or two floppy disk drives, and MS/DOS 2.1 or higher.

Attention dBASE II and dBASE III users. dBASE II to cENGLISH Converter now available; dBASE III Converter available later this quarter. Converted code is portable to micros or minis and executes as fast as original cENGLISH source.

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SAMPLE cENGLISH PROGRAM

```

IDENTIFICATIONS
MODULE  Minname
AUTHOR   bob
DATE     8/29/84
REMARKS  Sample cENGLISH program that adds first
         names to a file
END IDENTIFICATIONS
  
```

```

GLOBALS
FIXED LENGTH 1 ons
FIXED LENGTH 15 Frame
END GLOBALS
  
```

MAIN PROGRAM

```

BEGIN
  CLEAR SCREEN
  SET ECHO OFF

  USE "NAMES"
  VIEW BY "ID, NAME" ASCENDING
  
```

```

  AT 23.1 SAY "Add a record? Y or N"
  AT 23.25 ENTER ON USING "Y"
  
```

```

  WHILE ONES EQ "Y"
    CLEAR GETS
    AT 6.1 SAY "Enter first name"
    AT 6.20 GET Frame
    READ SCREEN
  
```

```

  INSERT
    Frame = Frame
  END INSERT
  
```

```

  AT 12.10 SAY "Welcome to cENGLISH C 8 Frame"
  WAIT
  AT 14.10 SAY "HIT ANY KEY TO CONTINUE"
  STORE " " TO ones
  AT 23.1 SAY "Add another record? Y or N"
  AT 23.30 ENTER ON USING "Y"
  CLEAR ROW 1 TO ROW 23
  
```

```

END WHILE

  AT 12.10 SAY "That's all for now!"
  UNUSE "NAMES"
  SET ECHO ON
  
```

END PROGRAM

**I'd like to know more about cENGLISH.
Please send further information.**

Name Title

Company Telephone

Address

City State Zip

Check one: ☐ End User ☐ System House ☐ Dealer ☐ Distributor

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425 St. Antoine, Suite 105, Quebec, Canada G1R5B4

Phone (418) 524-4041

cLINE™, Inc.

CACB4

SOFTWARE & SERVICES

PCR from page 65

ceive unlimited use and maintenance of the MRP software for 25 years after paying one flat fee up-front. The benefits were offset by a substantial risk, Milnes said.

"[PCR] took a risk because we could have designed a completely unusable system that they couldn't sell," he explained. "On the other hand, we were taking time and a lot of knowledgeable people to work with them."

Most input at design end

CTS assigned three people during the spring and summer, two people in the fall and one person in the winter to work virtually full-time with PCR. Most of the CTS input came at the design end, and then the compromise began.

'One problem was that we designed a lot more [features] than human programmers could code, and the project turned out to take far longer to finish than we thought at first. . . . [But] if we had written it ourselves, it would have taken a lot longer.'

—Mike Sherck, programmer/analyst, CTS Corp.

"One problem was that we designed a lot more [features] than human programmers could code, and the project turned out to take far longer to finish than we thought at first," Sherck said. "If I could do it again, I would have tried to generate numbers during design for how long the coding would take."

But he added, "If we had written it

ourselves, it would have taken a lot longer."

Both men noted that a joint development arrangement is not for the fainthearted. "It's very important that you understand the risks up front," Sherck said, "and you have to be willing to be frustrated. The vendor will want to do things to make the package more generic. You have

to be willing to compromise."

Milnes also stressed the need for a carefully structured contract that spells out what the product will do and what it will cost. Unforeseen problems are likely to occur, he said.

'Step-wise approach'

Milnes said a contract should specify a "step-wise approach. You should have a contract for each part of the design," he said. "You should decide what you're going to get and what you're going to pay for it." But he cautioned, "You also can't let lawyers huddle in a courtroom for days. There has to be give and take between you and the vendor."

In contrast with the manufacturing systems CTS used, to use the PCR MRP package "is like a bullet train compared to a horse and buggy," Sherck said. "I don't think there's any small group that could have designed and built this. It's just too big."

Added Milnes, "I'd rather go the route of buying off the shelf whenever possible. But we just couldn't do it. The software wasn't there."

ISPF from page 65

host environments. A dialogue managed by ISPF consists of selection panels, or menus, from which the user selects a particular processing option, functions that perform the requested processing and data entry panels on which the user supplies the additional information needed for the application.

Application development aid

The spokesman said ISPF/PDF for SSX/VSE aids in the development of various types of applications, including dialogues. It may be used with conventional structural and programming techniques, and it provides simplified procedures for development of dialogue applications.

ISPF/PDF provides functions such as multilevel programming library support, full screen context editing, models that help a user develop dialogue panels, messages, function routines, file skeletons and tables, scrolling of source and data listings, utilities, interfaces to standard language processors, dialogue test facilities and on-line tutorials.

The enhanced version of ISPF for VM features CMS sequential file support, added library definition services and CMS/DOCS simulation support. In addition, added dialogue manager functions include an IBM APL interface that supports IBM's APL2 system in VM, an IBM Graphic Data Display Manager interface allowing graphic objects to be displayed within an ISPF panel, table enhancements and added device support for 3290 terminals.

So-called usability enhancements include added profile pool support, a dynamic screen area that may be accessed and controlled completely by the application, display, variable and file tailoring enhancements and panel update program descriptions.

Version 2, Release 1 of ISPF for VM has a \$600 initial charge and a monthly charge of \$166; for SSX/VSE, the initial charge is \$749, and the monthly charge is \$76. ISPF/PDF for SSX/VSE has an initial charge of \$800 and a \$125 monthly charge.

IBM's National Accounts Division is located at 1183 Westchester Ave., White Plains, N.Y. 10604.

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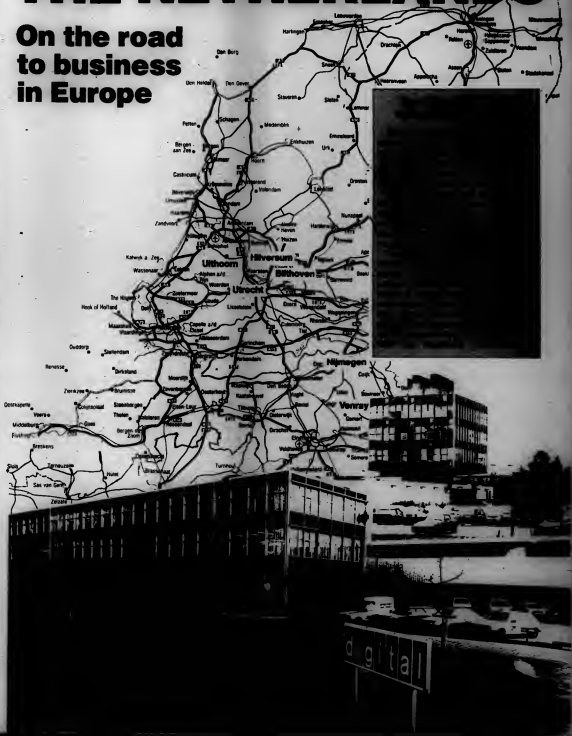
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IN DEPTH

THE NETHERLANDS

On the road
to business
in Europe



IN DEPTH/THE NETHERLANDS

extremely outward-looking country. Always select an outward-looking country."

"We are looking for foreign investments," says Martin de Leeuw, deputy commissioner for foreign investments, "but not for the sake of employment. We're looking for the long-term benefit. Foreign companies setting up here pay taxes, but they are small, because we have liberal tax policies."

These financial incentives do not rival the tax holidays Ireland proffers. The Netherlands is not jumping into a bidding war for high-technology business. This country of just 14 million is flipping over the coin, saying, "Look at the other side."

■ We may not offer much of a home computer market to sell to, but we can give you Europe as only a "Dutch trader" knows how.

■ Our citizens won't risk their savings to fund new ventures, but our government started the MIP Equity Fund in 1982 with \$400 million capital to meet your needs.

■ The country is small and crowded, but we have built a transportation structure geared to getting goods into and out of the country as fast as you need.

"Europe in general and maybe the Dutch in particular are very negative," de Leeuw notes. "We say the cup is half-empty. I think it goes back to the 16th century, when we changed from Catholic to Reformation with Mr. Calvin. We always say, 'It's not good enough.'"

In September, ITT Corp. decided the Netherlands was good enough as a central distribution site for Europe and eventually to the Middle East and Africa.

"That was a major decision," de Leeuw says, "because ITT made a thorough study. We must really be number one. ITT will set up distribution centers in the U.S., Japan and the Netherlands. They studied Europe for 24 years and found out that on a cost basis, the Netherlands was by far the best country."

The Dutch government has identified the critical stages companies such as ITT go through in developing a mature, European operation: 1) establishing an initial European presence; 2) spreading into several countries; and 3) developing an integrated European organization.

According to de Leeuw, the government assists at each point, by gathering market information for a company in stage one, for instance, then helping to create a sales organization and consulting on locations and Customs procedures. The government might also propose a joint venture as the quickest means of entry into Europe. The Netherlands In-

dustrial Commission will select prospects and aid in negotiations.

In the second stage, the government helps evaluate whether it is feasible to create a European assembly plant, centralized distribution or research and development facility.

At the final stage, the foreign company will be supported in considering regional headquarters and administrative coordination centers.

Government grants for research, called Basic Research Subsidies, can amount to \$260,000. One requirement: Any products resulting from the research must be manufactured at least partially in the Netherlands. The government takes no equity position in the companies receiving these subsidies.

Such grants are comparatively easy to land. "The first one you get just if you fill in the application," de Leeuw says. A sound track

record in scientific as well as the commercial development of products ensures the subsidy.

Also in the field of R&D is the High Technology Grant, given when a product is new to the Netherlands, has a high added value and advanced technological characteristics.

The Technology Development Loan goes to companies on favorable credit terms. Companies pay back loans only if the product makes a

profit.

Two other basic grants are noteworthy: "One is a 12.5% tax break given on investments in buildings and equipment — everyone gets that," says Roosevelt. "You get the tax break only when you have a profit, of course."

"The second is a cash grant, given by the government as a percentage of investments in buildings and equipment." The Dutch government coaxes companies to the outlands of the north and

How to be in 16 places



IN DEPTH/THE NETHERLANDS

south with grants running as high as 36% of fixed assets up to a maximum of \$6 million. The cash grant applies to initial as well as add-on investments.

The MIP Equity Fund operates much as venture capital funds do in the U.S. It was started by the government as a means to fill in where private capital was sorely lacking. MIP combines pension funds with private and state money. The minimum investment is \$1 mil-

lion. Twenty smaller venture capital funds seek investments under \$1 million.

The Dutch have long looked beyond their narrow borders for partners in trade. Citizens from cable to chief executive officer learn to speak English, German and French in school. Rotterdam is the world's largest port and Schiphol one of the most efficient airports. The Dutch move people and goods in and out so fast it sometimes seems there

is no border at all.

This effort to be an international trading country runs up against strong protectionism within the European Economic Community (EEC).

"Computer companies are more willing to set up in bigger countries where there is a bigger home market and a tie to a bigger government," de Leeuw says. "For instance, MAI, an American company, was planning an extension in Enschede [the

Netherlands], but they wouldn't do it because to sell to France, they had to set up there. France will say, 'If you don't set up here, you can't sell here.'

"It can be a major problem having no home market. France is suggesting, especially to Japanese clients, that if they locate outside France, they won't be allowed to sell inside France."

The Netherlands is a founding member of the EEC, which recently devised

Esprit. This European Strategic Program for Research in Information Technologies is a plan for the 1990s that hopes to encourage common spirit among The Ten where now there is open competition if not commercial combat. One project funded in Esprit's pilot stage was the development of a very large-scale integration description language by Philips Information Systems, Inc. and West Germany's Siemens.

Philips, located in Eindhoven (or Philipssteden, as it is known), is No. 26 on Fortune's list of the largest industrial companies worldwide. With sales of \$16,176,941,000, net income of \$226,631,000 and 343,000 employees, the electronics giant possesses the stable center around which the Dutch can create a computer industry.

In October, Philips launched one of the world's largest private telephone networks, an 18,000-extension system to handle voice and data for employees in Eindhoven.

Philips recently joined Siemens, a \$15,724,273,000 company, to develop and manufacture advanced microchips with 1M bit and 4M bit memories capable of storing 16 and 64 times more data respectively than 64K bit chips.

Currently, European-owned companies supply no more than 10% of the world semiconductor market. The hope in The Hague and Bonn is that this kind of commitment between Europe's supercompanies will pump up the continent's lagging computer industry. Production of these chips would not take place until 1989. In 1986, Philips and Siemens will make the critical decision to carry on with their production plans or not.

Closer to its home base, Philips formed a venture partnership with the Nederlandsche Middenstandsbank in 1983 to provide start-ups in Holland with scientific and entrepreneurial support. Philips was not buying itself new ideas; in fact, the bank would have to bid along with any other interested parties for the products that might come from this program. Philips is taking on the role of leader in vitalizing the climate for electronics and computers in its home country.

The Netherlands is considered seventh on the most-favored list of sites for U.S.-owned electronics companies to locate subsidiaries. Still ahead are Britain, Ireland, West Germany, Mexico, Japan and France. Canada and Italy have been surpassed.

The following reports picture Holland's computer industry through the business of several companies, both domestic and foreign, operating there.

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IN DEPTH/THE NETHERLANDS

One-stop supplier

ADVANCED SEMICONDUCTOR MATERIALS INTERNATIONAL (ASMI), Bihoveen

ASMI, the "not-so-little-anymore" maker of chip manufacturing equipment, thrives because traditional semiconductor companies do not have the design experience or expertise to build their own machines. Customers include Intel Corp. and Motorola, Inc., as well as computer vendors such as IBM and Digital Equipment Corp.

Philips, the Dutch electronics giant with annual revenues exceeding \$16 billion, joined ASMI last April in a 50-50 venture to build and market

the stepping aligner used to print integrated circuits onto silicon wafers. Philips, which operates Europe's largest chip factory, developed the stepper for internal use.

"We found Philips sitting on a tremendous wealth of technology," says Arthur de Prado, ASMI president and chief executive officer.

"We said, 'Why don't you let us bring it to market?' It took them many years to digest that idea."

The venture, ASM Lithography Systems Ltd., gives ASMI access to Philips facilities and, just as important, Philips engineers. "We lifted 50," de Prado says, on small boost to ASMI, a company with annual sales estimated at \$115 million for 1984.

De Prado notes that it is characteristic of European companies to develop technological advances in-house but not market them. "Philips

was ahead of everyone in videodisk technology but gave the market a way because it didn't move. Philips is changing its posture now, through joint ventures, for instance."

Designing automated factory

The stepper fills out ASMI's product line, creating, in effect, a one-stop supplier. "We can now start designing the automated factory better than most of our competitors because of our product mix for the entire process," de Prado asserts. Together, ASMI and Philips are aiming for 30% of the lithography market by 1988.

De Prado projects worldwide semiconductor sales of \$32 billion in 1985, up from \$24 billion this year. Wafer diameter dimensions will change drastically. "It is four inches now, eight inches is around the cor-

ner, and we have even seen 10 inches. We're looking at lifespans of only seven or eight years. That means tremendous changes in equipment."

ASMI's stronghold now is in chemical vapor deposition (CVD) equipment and also plasma-enhanced CVD. There was no use designing for the small Dutch home market or even the wider European market, which lacks, de Prado says, "the dynamics or cohesive structure to justify the investment."

"We had to become a global company. Here it's not like in Silicon Valley, where there are markets everywhere around you."

Capital from U.S.

To become global, ASMI needed capital. "We had been growing through internal financing until 1980," de Prado says. "We realized that unless we found a good source of financing, we could not keep up. We looked to European equity funding, but Europe is asleep, or was asleep, in this area. The Dutch capitalistic system is broke. It is trying to recover. If it doesn't, the chances for technological development are not good. We cannot keep looking to government."

ASMI shed its "funny little Dutch company" image and drummed up capital in the U.S. The company's stock is 20% publicly owned — 80% of that by Americans.

It is curious, perhaps, that Americans are more interested than the Dutch in investing in a Dutch company. That de Prado accepts. But the Dutch government's actions toward home companies quite visibly anger him.

"The government is not yet industry-oriented," he says. "The response mechanism is so slow we would have to have a special department to deal with them. I don't think the Dutch government has a vision yet related to industry. They should not be trying to bring in American companies [to the Netherlands] at the expense of neglecting companies here."

"The government is responsible for some of the negatives — such as taxation. It is responsible, in a way, for its own headaches. If the climate doesn't change, if it got to where we couldn't raise money, then we would have to go. I'm being very critical about our climate, but it's by pure experience."

Advantages at home

De Prado does go on to mention the considerable pluses to being a homegrown Dutch company or even a foreign doing business there. "In America, management changes every year," he says. "The pressures are tremendous for short-term growth. Dutch companies are more stable. The unions do not bother us. For any well-run company, they shouldn't be a fear factor. We have more union pressure in Phoenix than here. And the education base is very sound. The engineers can stand up to any technological changes."

De Prado admits that if ASMI had started in Silicon Valley, he would probably not have brought the company to Holland and to business.

But he cautions others not to follow his logic necessarily in choosing where to set up foreign facilities. "Many companies make the decision to go where their markets are. It may be the fastest way, but it may not be the best."

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In 1983 we introduced the 200 Series, allowing connection of asynchronous data collection devices such as bar code scanners, magnetic scanners, scales and process controllers to the 8100's loop.

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The MIT Museum

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IN DEPTH/THE NETHERLANDS

Supply center to Europe

ITT CORP.

THE NETHERLANDS

ITT, the telecommunications, industrial technology, natural resource and diversified service company with annual sales exceeding \$20 billion, has operated in the Netherlands for 74 years. On Sept. 10, this conglomerate with headquarters in New York City chose this country as the centerpiece for worldwide distribution of certain products.

"This now establishes Holland as our major redistribution center in Europe," says Leven Soorikian, the director of physical distribution and logistics for ITT. "We will be able to do here what we do in the States now—react within 24 hours to delivery anywhere in the country."

ITT expects to reduce inventory and transportation costs for goods shipped to and from Europe. In the computer area, those goods include personal computers, printers, semi-conductors, connectors and telephone equipment. The port of Rotterdam and Schiphol Airport will be the entry points for the shipments, which will bear an expected transit value of \$50 million.

According to Soorikian, the Netherlands was chosen because of rapid Customs processing, a strong transportation infrastructure and sophisticated communications links to ITT facilities worldwide. From the Netherlands, ITT will ship to Madrid, Paris, Milan, Stuttgart, Vienna, Antwerp, London, Oslo, Copenhagen and Stockholm. The estimated yearly load through Rotterdam is 5,000 con-

tainers of finished goods, semi-assembled products and raw materials. Air freight volume expected through Schiphol is 8,000 tons per year.

Within Europe, ITT expects to minimize air shipments by collecting inventory at a single distribution spot, Soorikian says. "That makes it possible to keep a pipeline and meet schedules without spending an inordinate amount of money for premium transportation."

In the first phase of the plan, existing Dutch transportation facilities will be used for assembly and distribution. Later, ITT's own facilities will take over the single source of inventory for Common Market countries as well as Africa and the Middle East. In the last phase, ITT will use its centers in the Netherlands to store parts and do repairs.

"Right now," Soorikian says, "it's not bad service in Europe, but it's located in many points. We're hoping to be able to provide at least the same level of service but not with inventory scattered throughout so many different places. When we go into the repair area, then we will have all the components and repair parts in one place. Right now repair is scattered; we hope to concentrate it."

Soorikian sees no barriers to implementing phases two and three because "it is easy to establish bonded and freeport facilities in Holland. Configuration of high-tech equipment for exports and imports will be performed under freeport conditions."

The new ITT distribution center is expected to create 200 to 300 new jobs and provide millions of dollars of new business for Dutch transportation companies.

Joint venture in switches

AT&T and PHILIPS TELECOMMUNICATIONS, B.V. Riversum

AT&T developed the digital switch; Philips is modifying it for application in CEPT and CCITT networks. The result is the SESS-PRX, a digital exchange product offered by the joint venture company formed out of the communications and electronics industry giants.

They decided a realignment of forces was necessary to produce economies of scale in manufacturing, aggressive research and development capabilities and a stable supplier environment to service customers. The joint company, launched early this year, intends to develop, manufacture and market systems for public telecommunications networks for countries worldwide.

Philips will internationalize AT&T's basic switch, the SESS, by modifying such things as the physical cabinet, the power requirements and the interface to maintenance operations. Philips also contributes its national organizations—marketing groups so assimilated into the host country that most citizens believe the company to be native. These sales organizations theoretically can respond quickly to the needs of local telecommunications authorities.

"Fifteen years ago, we were a happy industry," says P.C. Kuznik,

vice-president of marketing. "We were mature, conservative management. That all is gone."

The estimated \$40 billion world telephone market cannot support the massive development costs associated with a new switch, Kuznik says, for most companies. A European company going alone would need to win 100% of several major countries just to recover development costs.

In 1982, AT&T owned 23% of the switching equipment market and Philips 2%. Kuznik puts the cutoff point for recovery of cost by the new joint venture at 15% of the market. In this venture, AT&T provides the developed product and Philips, by virtue of being a Dutch company, eases the way through the European Economic Community.

Kuznik sees a tremendous hunger for high technology in Europe. Yet there are obstacles. "We are nowhere near open telecommunications as in the U.S. But costs are becoming so that maybe someday . . . At some point, governments are going to say they can't afford to back public telephone systems."

"In Holland," Kuznik continues, "there is no capital gains tax, so no way to write off a loss. If you invest in something and it flops, you are in trouble. Of course, profits are not taxed either, but who would risk his savings?"

One other advantage Philips gets from the venture is access to AT&T's Unix. "We have Unix as used internally at Bell Labs," Kuznik says. "Which is one or two steps ahead of what is available commercially."

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IN DEPTH/THE NETHERLANDS

Why locate in Holland?

EUROPEAN CENTRALIZED
LOGISTICS OPERATIONS
DIGITAL EQUIPMENT CORP.
PARTS CENTER
Nijmegen

DEC management asked itself a question back in 1981: How could the company better supply its installed base in Europe, which now numbers 100,000 computers? Supplying directly from the U.S. was too time- and money-consuming.

A site on the continent was needed. The Netherlands was chosen.

Analysis of DEC's decision-making process points up Holland's advantages as a distribution site. The company first identified the variables in its business needs: stable business environment; proximity to efficient transportation; workers with international business sense; trained high-technology people; high-quality telecommunications possibilities; and close proximity to the concentration of DEC revenue-producing locations.

"We felt subsidies were the last consideration," says Simon Dijkhuizen, general manager at the Nijmegen facility. "Operational factors were most important. The UK was considered too peripheral and Ireland too high a risk as well as too peripheral."

Potential countries numbered four: Belgium, France, Germany and Holland. The selection criteria were broken down to the categories of distribution, personnel, telecommunications and financial.

The Netherlands equalled or surpassed its three competing countries in each element of distribution, ranging from Customs attitude (Holland's famous "five-second Customs" processing), banking facilities, transport network and cost and so on.

In terms of the personnel criteria, Dijkhuizen says, Nijmegen sits across from Europe's largest semiconductor plant run by Philips Information Systems, Inc. and still has no problem finding workers. That isn't surprising in a region of the Netherlands suffering 31% unemployment.

The Netherlands fared worst in the area of telecommunications, being judged by DEC as adequate but not superior in international voice and data capabilities, satellite transmission, degree of regulation and cost.

As for financial incentives, Dijkhuizen notes that there were "com-



DEC chose the Netherlands as the supply center for its European customers.



Simon Dijkhuizen
General Manager
Nijmegen Parts Center

IN DEPTH/THE NETHERLANDS



Robert Campbell
General Manager
Software Distribution

petting reasons to open another facility in Ireland, which offers tax holidays of 30 years sometimes. But we chose to optimize around distribution."

In the Netherlands, a company can individually negotiate tax rules with the government. A distribution center such as at Nijmegen services profit centers in Europe and is doing so has costs but no real profits. The "cost-plus" method of taxation is used. A percentage, normally negotiated between 10 and 25, of the cost of the distribution center to do business is subject to the corporate tax rate. DEC negotiated a 10% level.

The Nijmegen facility receives about 30 tons a month of defective parts from European subsidiaries for repair. The town isn't particularly close to Schiphol airport or Rotterdam harbor, the two prime locations

in any distribution strategist's plans. But there are tax benefits to locating further east in the Netherlands, and 90% of the parts come to Nijmegen by truck rather than by air or sea.

More recently, DEC decided to centralize its European software distribution system in Nijmegen, with American Robert Campbell as manager. He says, "The Dutch work ethic is extremely high; the workers are industrious, conscientious, aggressive. They're much more interested in details than Americans. I was shocked that assemblers and materials handlers were so interested in the details of business."

When DEC relocated the European Software Distribution Center to Nijmegen, Campbell experienced a few cultural work differences. On one Friday he called a secretary to work overtime on Saturday morning and

received a most amazed look. He discovered that workers expect management to plan better, to ask ahead of time for weekend work. They guard their time off.

About the workers council legislated by Dutch law into the management lives of corporations, Campbell says, "It frightened the life out of me in the beginning. It really isn't like a union — it's a partner."

Software development is distribution-sensitive, and DEC looked at Ireland, Spain and the UK as central sites. The software center began in Galway, but demand could not be met from that Irish location.

"Galway isn't serviced by a major airline," Campbell says. "Shannon is primarily a tourist airport. You can't get anything out of Ireland. There was growing market pressure for fast turnaround of 48 hours. It's possible now to get our product in the hands of users anywhere in the continent within 24 hours, if necessary."

Working toward OSI

NCR SYSTEMS ENGINEERING Utrecht

NCR Corp.'s presence here is small — a \$7 million investment at offices employing 125. The importance of the development work goes much beyond the figures.

European countries are leading proponents of the International Standards Organization's Open Systems Interconnection (OSI) model, which attempts to make compatible local and long-haul networks. "The work is being done here," says NCR's P. Van Roekel, "to prepare the company for products to meet the OSI model. It's coming."

According to Van Roekel, the Systems Engineering group at Utrecht is also leading the move within NCR to IBM's Systems Network Architecture (SNA) communications marketplace. We have developed here high-speed modems for connecting to IBM. These modems apparently work with IBM's SNA modems.

Miran is a mid-range local-area network being developed jointly by NCR on the communications end (transceiver and channel designs) and Intel Corp. on the controller side (local-area network controller design). The first products from this project are expected early in 1985. Miran reportedly can run on cabling schemes from both IBM and AT&T.

Miran's objectives are:

- Low cost per connected device
- Suitable for coaxial and twisted pair wiring
- Designed for transaction-type systems.

■ Based on international standards.

■ Use of international standards (IEEE 802.3).

■ Capable of covering 3,000 meters' distance.

■ Design available to the industry.

■ Workstations removable without taking the system down.

Currently, the coaxial system for Miran is operational. Samples of the transceiver in development by NCR are expected by the third quarter of 1985. Samples are available now of Intel's controller.

Until now, when you operated the PC in the terminal emulation mode, keys had to be redefined.

For inexperienced users, that could be both awkward and time-consuming.

What's more, it's always required quite a few keystrokes to engage a PC-to-mainframe function such as file transferring.

The result again was an increase in the chance for human error.

As well as an increase in the amount of time and money spent on a job.

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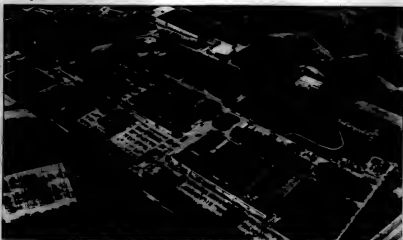
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IN DEPTH/THE NETHERLANDS



The manufacturing plant at Venray is one of the most advanced Xerox units.

Advanced MRP in action

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Venray
To the 119,000 sq. meters of buildings here each day come 40 truckloads of parts; 36 leave again with manufactured goods.

The 2,100 employees of Rank Xerox in Venray produce copiers and output devices, specifically the world supply of processors for the Xerox Corp. 1045 and the output modules for the Xerox 1075. Goods are distributed to 80 destinations in 50 countries.

Rank Xerox at Venray typifies full-blown manufacturing resource planning (MRP) principles. It is a "just-in-time" plant linked to automated handling of parts and control of the supply lines.

According to A. Noordijk, manager of general services, the company uses the transport network to buffer incoming parts flow. Trucks can be speeded up or slowed down throughout Europe so that they arrive at their specified hour. The "window" for suppliers to deliver their parts is zero to three days.

Venray is one of the most advanced Xerox units. Power for automating the manufacturing control is furnished by an IBM 3083 for the Xerox Management Program, a Data General Corp. MV 10,000 (2x) for the Automated Material Control System, a DEC PDP-11/29 and Zilog, Inc. 80 (6x) for the cranes and shuttle cars, as well as the automatic guided vehicles.

No-inspection policy

Rank Xerox reduced from 4,000 to 600 the number of its parts suppliers and instituted a no-inspection policy. The assembly line reject rate of 1,500 per million now compares with 10,000 in 1982. Inventory was reduced from nearly three months' worth to about 25 days. By year's end, 90% of the supply will be just in time.

It took four years to educate suppliers of the 40,000 parts coming in of the necessity of delivering on time. The operating philosophy is: If you can control the external supplier, you don't need extensive inventory.

In the change to an automated manufacturing facility and with the decision to use Xerox Computer Services, located nearby, for computing power, the DP department at Rank Xerox, Venray, dropped from 150 to 5.

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IN DEPTH

Portables on the factory floor

The factory floor has become a primary target in the corporate battle to improve productivity.

By John Balga

Until recently, hand-held computers were little more than advanced calculators with limited use of variables, programming languages and memory. They were, however, useful for making quick calculations and running small "canned" programs. But the past few years have witnessed the global acceptance of the personal computer and a growing interest in more powerful hand-held computers.

The new hand-held computers offer the user many of the features of a personal computer in addition to several unique extras. A typical hand-held configuration will support a display of anywhere from one to 25 lines, full keyboard functions, random-access memory,



IN DEPTH/PORTABLES IN THE FACTORY

receiving dock, the supervisor instructs the fork-truck operator where to store the delivery, either verbally or as a note scribbled on a piece of paper. The operator proceeds to stock the delivery and returns for another run.

To improve this kind of operation, a hand-held computer can be installed on the fork truck. Before each shift, information concerning the current status of the warehouse facility and expected deliveries is downloaded into the hand-held computer.

Upon receiving a shipment, the operator enters the number and/or description of the delivery. The computer will then determine and display the desired location for the delivery.

Once at the specified location, the fork-truck operator keys in the actual storage location, and the time of day is automatically recorded. In addition, the computer generates a label identifying the contents of the delivery, vendor information and the date of delivery. The label is then applied to the shipment to enable a visual inventory inspection. At this stage, a label can also be generated to serialize important inventory items.

The input information is uploaded to a host computer following the completion of a shift. This data is then used to update the available storage facilities in the warehouse as well as inventory counts.

The installation of a warehouse receiving system will eliminate the requirement of having a routing supervisor at the receiving dock. In addition, making received goods available to manufacturing quickly may eliminate the problem of running out of raw materials.

Inventory control

Inventory control is probably the most prominent application for hand-held computers. The process of counting inventory obviously requires mobility. Therefore, the paper-and-pencil approach was ideal and is still the primary method of acquiring inventory counts.

Initial inventory counts are based on the data received from the warehouse receiving operation. As the inventory is distributed and depleted, inventory counts are decreased. The inventory tallies are keypunched periodically into a host computer in order to generate inventory reports.

The issue of timely information is important here. If the inventory levels are to be maintained above a critical level, the depleted inventory counts must be recorded immediately following a shift, and management must provide the respective reports shortly thereafter. A timely inventory feedback procedure may eliminate stock

outages as well as reduce the amount of inventory required.

The application of hand-held computers offers a solution to this problem. Hand-held devices containing current inventory data can be provided to each worker. The computer guides the worker to particular items that must be accounted for. The worker inputs the quantity of items at that particular location. If there is a discrepancy between the

expected and actual number of items, the device will prompt the worker to recount the items and record occurrence. At the completion of the inventory, the recorded data is uploaded to a host computer and inventory reports are generated.

Front-line control

Factory-floor operations use various systems to track the rate of production. A common approach to this problem has been to require

a supervisor to inspect the production of each workstation at selected time intervals and record the accumulated results.

The accumulated production is then compared with an expected calculation of output. If a discrepancy exists, the supervisor must then track down the cause of the shortage or surplus.

Each problem and any action taken to remedy it is recorded in a production log.

The production readings

and problem reports are handed over to a keypunch operator at the completion of a shift. The data is entered into a host computer, which generates production reports for management, usually on a weekly basis. During this keypunch phase, human encryption errors and keypunch errors may introduce fluctuations in the actual production that will either cover up or increase the number of problems.

The problem with this



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IN DEPTH/PORTABLES IN THE FACTORY

In general, technology for portable data entry terminals has been slow in reaching the industrial marketplace. Many small companies have come along to foster the technology.

approach lies in the time it takes to acquire and process production data. Any production problems will exist for at least a week before they are filtered to management.

And by the time management investigates a problem, it may no longer be apparent, and other problems may exist.

A hand-held computer can provide for automatic recording of production output, and any required perfor-

mance analysis can be calculated immediately for review.

With this system approach, the supervisor is prompted to inspect production, a verification is performed on all data input by the supervisor.

Expected output is calculated automatically, based on the operation and manpower applied, an on-line analysis is performed and the key-punch requirement is eliminated.

Bringing in a portable

General Electric Co. uses a portable computer for data entry in a shop-floor pilot project involving eight workstations. The system enables a supervisor to analyze performance on-site. In this front-line control operation, all the necessary questions are displayed by the terminal, a search is conducted for errors and calculations are performed automatically. At the end of the shift, all performance data is transferred to a host computer for further processing and data logging.

The first step in designing this system was to establish its flow. Then hardware and software specifications could be determined.

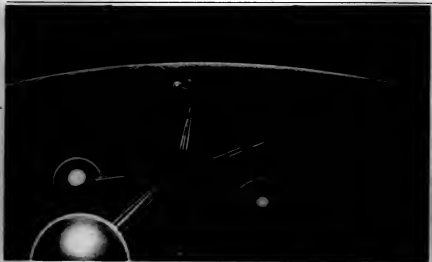
Given a production schedule, the supervisor would initiate the terminal every day by entering the type of operation being performed, the manpower for each operating station and the expected production rate for each station. At select times during the day, the supervisor would record the actual production output at each operating station via prompting by the terminal. If the output rate fell below expectation, the terminal would immediately display the variance and query the supervisor to identify the problem as well as what action would be taken to remedy the situation.

Upon termination of the work shift, the portable data entry terminal would transmit all recorded information concerning the operation's activities to a host computer, where it would be converted and stored in a resident data base.

Hardware selection

With the system flow defined, two pieces of hardware had to be selected: a host computer and the portable data entry terminal. Initially, the only major constraint was cost, which was set at a maximum of \$6,000 for the host computer hardware, \$2,000 for the handheld terminal.

The selection criteria for the host computer were kept general: a reliable microcomputer system that could support external data communications and could use a large selection of development and application software. The IBM Personal Computer was selected to perform the host computer functions because of its interface options and the amount of commercial software. Among its available adapter cards are RS-232 asynchronous communications, parallel I/O and graphics display. The estimated price for the Personal Computer was \$4,000.



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IN DEPTH/PORTABLES IN THE FACTORY

The terminal selection process developed into a major egg hunt. In general, technology for portable data entry terminals has been slow in reaching the industrial marketplace. Many small companies have come along to foster the technology. The selection criteria were based on obtaining a device that supported a conventional full alphanumeric keyboard (without second function key entry), data transmission capability and a large display window.

The HP75C was finally selected. A recent entry in the HP portable line, the 75C weighs 36 oz. and measures 10 in. by 5 in. by 1.25 in. Powered by nickel-cadmium batteries, it contains a 48K ROM-based operating system with Basic, which supports up to 24K bytes of RAM, a 32-character LCD and a typewriter keyboard. External hardware, such as printers, video monitors and communications links, can be added to the system using adapters attached to the HP-IL. A fully loaded HP-75C lists at \$1,895.

Applications software design

The front-line control system design was now out of the woods. The only remaining task was to develop the data acquisition and data transmission software. The front-line control system software is divided into three modules: initialization, data collection and data transfer.

Initialization is performed before the beginning of each shift. The supervisor selects a model number of the given production process being performed, and the corresponding data is loaded into the shift data file. The data for each workstation is then displayed for the supervisor to confirm or to update.

After the initialization is complete, an appointment file containing time intervals for monitoring production output is loaded. When the real-time resident in the HP-75C reaches a set time, a beeper sounds, reminding the supervisor to monitor workstation production.

For each workstation, the system prompts for the cumulative production output. The expected output is computed for the elapsed time and compared to the actual output for that time interval. Any shortage causes the system to prompt for further information concerning the shortage, such as possible cause, persons notified, action taken and an optional description.

For both the initialization and data collection process, input is checked for certain obvious user mistakes, such as alpha input in lieu of numeric. Input that passes this review is then echoed by the HP-75C for confirmation so that logical errors can be corrected.

After acquiring all the production data for a given shift, a hand-held system is connected to the Personal Computer for data transmission. Initiating the data transfer programs at the HP-75C and at the Personal Computer will result in uploading the production data.

If any errors occur in data transmission, the supervisor is notified and the necessary steps displayed on the Personal Computer screen. Otherwise, a data file is created for the daily data and appended to the data file for the current fiscal week. Only if the supervisor signifies to the HP-75C that the data transmission for that day was successful will the HP purge the data files for that shift.

Besides reminding the supervisor when and what to enter, the portable system had to perform all the usual number of checks and double-checks of a data collection system.

The transferred data files are converted into data interchange format (DIF) at the Personal Computer. The DIF files can then be directly accessed by various commercial software packages compatible with this format.

Such packages include electronic spreadsheets (Software Arts, Inc.'s Visicalc, Microsoft Corp.'s Multiplan), data base utilities (Ashken-Tate's Dbase-II, Visicorp's Visi File and Visi Desk), project scheduling (Visi Schedule) and plotting software

(Visi Plot/Visi Trend, Decision Resources' Chart-Master).

System software development

Developing software for the hand-held system was a unique experience. Programming on a portable computer requires the acceptance of several limitations. Even with the 8K memory expansion module, programs and data files could only occupy a limited 24K bytes of storage space. Exceeding this limit resulted in a "locked" condition, in which no

system commands could be executed, not even deleting files to free memory.

Yet, it was more than simply sealing everything down. Besides reminding the supervisor when and what to enter, the portable system had to perform all the usual number of checks and double-checks inherent in a data collection system. The area of human engineering was especially demanding.

Because the display line was only 32 characters long, each prompt had to be as concise as possible without being cryptic. In order to provide enough information, longer prompts were displayed in sections, with a timed delay in between.

At the same time, the system had to be kept as streamlined as possible, so that it did not become cumbersome to use. As with any system, it was a question of balance.

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IN DEPTH/PORTABLES IN THE FACTORY

The development of the IBM software was built around two factors: the method of data transfer and the rigid requirements of the data interchange format. Because of the nature of the data transfer, there was a high risk of losing individual characters. To prevent this loss, the input loop was limited to as few checks as possible.

At first, it was decided simply to check for a character and directly store it in an

array. Trying this out with several cables proved how dangerous this approach was. Because the port frequently picked up noise from the cable as incoming characters, the input array was quickly filled with garbage data before the HP-75C had signalled the end of transmission. Although it increased the chance that a character might be missed, a second check was added to the loop. Only those characters of decimal code 122

(lower case z) or less were stored in a vector array. Termination of the transmission was signalled by two bell characters in a row on the rather reasonable assumption that chance (and noise) would produce two such characters in a row.

After the termination characters were received, the program separated the characters into words. This second loop converted the decimal codes to characters

and concatenated the characters until a carriage return was reached. The word, minus the carriage return, was then stored in a second array, still as a string. Because the DIF file organization was somewhat irregular, a third loop wrote the individual DIF records.

The DIF format itself is very particular in its construction, with checks and double-checks for each data record. Special header records declare the number of

rows and columns in advance. Each row is then marked by its own (BOT) header record. Individual data elements consist of two records. The first contains two numbers: the type of element (whether numeric, string or header) and a numeric value. The second record contains a string. If the element is numeric, the value in the first record is the value of the element and the string contains a "V." If the element is a string, the numeric value is ignored and the contents of the element are found in the second record. Finally, the end of data is marked by a special EOD record.

Strict requirements

Beyond this double-layered description, the programmer must beware of yet more. That innocuous-looking string record has strict requirements. Certain special headers require a null record surrounded by double quotes (" "). The BOT and EOD header labels and the V for numeric records must not be surrounded by quotes. The string for string elements varies. Strings containing any special characters (blanks, commas and so on) must be in double quotes, while a single word can do without. Files whose contents conflict with this are considered invalid and are not recognized by Visicalc.

In order to create a valid DIF file, a parallel format array was set up, containing the type and string length for that DIF record. As each string of the string array was read, the appropriate form of record was written, converting strings to numbers where necessary and

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IN DEPTH/PORTABLES IN THE FACTORY

fitting strings to the proper length.

Hardware interfacing

The next step in the system design was to integrate the host computer with the portable data entry terminal. Establishing communications between the two proved to be a nightmare. Since HP announced a May 1984 release date for the RS-232C interface on the HP-75C, the decision to use HP's General Purpose Input/Output (GPIO) interface for data communications was not difficult. The GPIO interface enables unidirectional or bidirectional communications with either an 8- or 16-bit parallel bus structure.

The IBM Personal Computer list of hardware options does not contain a parallel communications interface. It does, however, contain two parallel printer adapters, the Monochrome

interface adapter.

The initial response has been positive. However, the users have expressed dissatisfaction with the size of the hand-held device, claiming it from workstation to workstation.

Another complaint concerned using commercial software packages to access and manipulate the production data. While an experienced user of the application software can retrieve information he needs, the novice

manager often is intimidated by the package. Therefore, a customized data base/spread-sheet application program would offer user friendliness in addition to protecting access to privileged information.

Other users of hand-held systems have expressed dissatisfaction with one-line displays and physical dimensions. The one-line display, in many cases, does not provide the user with enough information and frequently

causes disorientation when he must enter multiple-line input parameters.

Some users find it awkward or uncomfortable to hold the computer in one hand and key in data with the other.

Nevertheless, the elimination of human inscription and keypunching have substantially decreased the number of input errors. The increase in productivity is immediate.

As the price of hand-held

computers continues to decline while convenience and number of functions increase, more applications opportunities will surface in automating factory procedures.

About the author

John Balgo is a technical researcher for a major diversified corporation. He is also a lecturer in engineering at the University of Bridgeport, Conn.

SCIENCE/SCOPE

The one-line display, in many instances, does not provide the user with enough information.

Display/Parallel Printer Adapter and the Parallel Printer Adapter (1606200). Further investigation into the technical reference manual revealed that both adapters "can be used as a general input/output port." Logic diagrams showed that the parallel adapter designs are not identical and both adapters only support parallel output.

The Parallel Printer Adapter contains the required hardware to perform parallel input, but an inherent design feature must be altered. (Heist up those soldering irons.)

After the adapter is modified, parallel input is enabled by writing a 20H to the Personal Computer's write control register.

In addition, when connecting the HP GPIO interface to the IBM Parallel Printer Adapter, several communications lines need to be crossed in order to maintain signal continuity.

The HP GPIO supports various handshaking options (strobed, full handshake, half handshake) in transmitting or receiving data. The strobed option was selected for this application.

In this application, the data will always be uploaded from the HP-75C to the IBM Personal Computer.

On the HP-75C end, the data will be transferred in Ascii format to the GPIO interface via the HP-IL/GPIO

Satellite images have led to the discovery of a large Mayan city hidden for centuries by the jungles of Mexico's Yucatan peninsula. Scientists uncovered over 100 possible ancient sites by studying false-color images provided by Landsat earth resources satellites. Jungles typically are made to appear bright red in these pictures. The ruins appeared pink or light red, because foliage had not grown as densely over the sites as it had in the neighboring jungle. The Landsat images also revealed the existence of vast farmed fields that may prompt new theories of how the ancient civilization was able to feed itself. The imaging instruments aboard the Landsat satellites, called multispectral scanners, were built by the Santa Barbara Research Center, a Hughes Aircraft Company subsidiary.

A U.S. Army laser device has been made less costly and more reliable by manufacturing its housing assembly in a new way. The improvements were made to the Ground/Vehicular Laser Locator Designator, which determines the distances to targets and pinpoints them for laser-homing weapons. The original housing assembly was made from a number of aluminum sections bonded together. The Value-Engineered housing is a one-piece fiberglass-nylon structure cast under high pressure. The changes stem from technology that was not available at the time the original contract was signed. Under the Department of Defense Value Engineering program, Hughes will share in the savings. The Value Engineering program is designed to encourage employees to look at the functions of a product and develop alternatives that cost less, perform better, and improve reliability.

A new vector network analyzer for millimeter-wave devices lets microwave designers make broad-band measurements at frequencies up to 110 GHz. The Hughes system uses a downconverter technique to convert a millimeter-wave signal into a frequency suitable for measurement on the Hewlett-Packard 8410 microwave vector network analyzer. The system permits analysis of all four S-parameters after a single insertion of the device under test, either in real time or, for enhanced accuracy, by computer-control using error-correcting software.

Development times for semiconducting very large-scale integrated (VLSI) circuits have been cut from greater than one year to 20 weeks at an ultramodern computer-aided training and design center at the Hughes facility in Newport Beach, California. Utilizing advanced design automation software, a comprehensive library of predesigned logic functions (called Macros), and preprocessed wafers, the new facility is helping engineers design chips with 2,000 to 8,000 gates and with as many as 180 pins. New 3-micron dual-layer metal HCMOS processes are applied to both standard cell products and state-of-the-art gate arrays. Skilled design engineers and education specialists at the Newport Design Center provide training and technical support for IC designers throughout the company.

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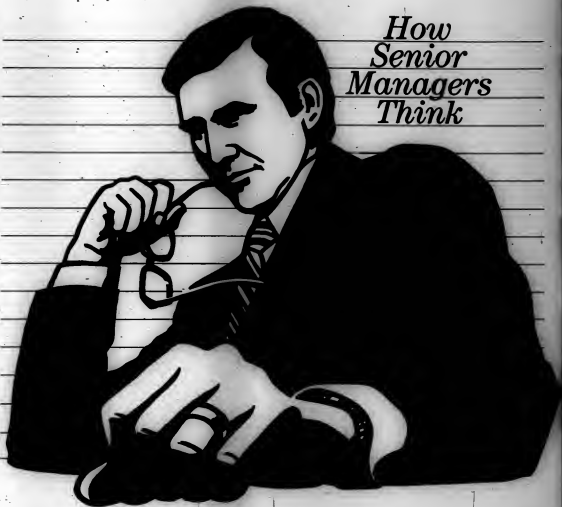
And the Chairman may even learn to feel the same way about you.

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IN DEPTH

How Senior Managers Think



By Daniel Isenberg

*"It is not enough to have a good mind.
The main thing is to use it well."*

— Rene Descartes

If you communicate with senior managers or aspire to move up through the ranks, you can benefit from knowing what concerns them and how they combine intuition and rationality to solve problems.

Jim LeBlanc phoned Steve Baum, who formerly worked in his division, to ask about the chief executive officer's new corporate task force on quality control that wanted to meet with Jim. Jim, the head of the industrial equipment division of Tanner Corp., thought that Steve, now director of technology, could help him figure out why the task force wanted to meet with him in two weeks.

"It's because you're doing so damn well

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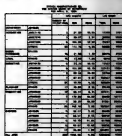
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IN DEPTH/HOW MANAGERS THINK

down there, boss?" Steve replied.

"Gee, thanks. By the way, Steve, what's the agenda for Singer's staff meeting for next week?" (Singer was the president and Jim's boss.)

"Well, we're going to talk about the reorganization and look at the overhead reduction figures for each division. Then Singer's going to report on last week's executive committee meeting and his trip to Japan."

"How did it go?"

"His telex from Osaka sounded enthusiastic, but he just got in last night, and I haven't seen him yet."

"Well," said Jim, "I guess we'll just have to see, but if you hear something, call me right away because if Osaka comes through I'm going to have to hustle to get ready, and you know how Bernie hates to shake it. Now, about the task force..."

In the space of three minutes, Jim LeBlanc got a lot done. In addition to collecting critical information about a task force that the CEO, with unusual fanfare, had personally commissioned one month ago, he also began to plan his approach to the upcoming staff meeting. He decided not to try to get a presentation by his marketing people on opportunities in the Far East on the agenda.

Sensing that Singer was optimistic about the Osaka trip, Jim decided that he should get his people ready for the possibility that the deal would materialize, which meant polling engineers off another project for a while.

What were the thinking processes that allowed Jim to get so much done so pointedly and so rapidly? What was going on in his mind during his conversation with Steve? How, given the incomplete and uncertain information that Steve gave him, did Jim conclude that the Japan deal was imminent?

Thought processes

For the past two years I have studied the thought processes used by more than a dozen very senior managers while on the job. The managers that I studied ranged in age from their lower 40s to their upper 50s, in managerial experience from 10 to 30 years and in current job tenure from four months to 10 years. Their companies ranged from \$1 billion divisions in Fortune 100 companies to \$10 million entrepreneurial companies just beginning to take hold in the marketplace.

Company products included low- and high-technology goods, and markets ranged from rapidly expanding to precipitately deteriorating. All but two of the executives were responsible for the overall performance of their business units. As all had been frequently promoted throughout their careers and were considered excellent performers across the board, they were a representative sample of today's successful business executives.

Two findings about how senior managers do not think stand out from the study. First, it is hard to pinpoint if or when they actually make decisions about major business or organizational issues on their own. And second, they seldom think in ways that one might simplistically view as "rational"; in other words, they rarely systematically formulate goals, assess their worth, evaluate the probabilities of alternative ways of reaching them and choose the

path that maximizes expected return. Rather, managers frequently bypass rigorous, analytical planning altogether, particularly when they face difficult, novel or extremely entangled problems. When they do use analysis for a prolonged time, it is always in conjunction with intuition. Obviously, decisions do get made in organizations, and these are frequently justified by data and logic. In particular, when viewed retrospectively over a long time period, effective executives often appear quite rational. Yet when studying their concurrent thinking processes, being "rational" does not best describe what the manager presiding over the decision-making process thinks about nor how he thinks.

I have a fourfold purpose in this article. First, I want to present a more accurate and empirically

grounded description of what goes on inside the minds of senior managers (see sidebar on D/32). Second, I hope to offer a more accurate description of managerial thinking that should help provide a beginning language for talking about these elusive mental phenomena. Third, I hope that this language will also help to relieve some managers of the inconsistency between their view of how they are "supposed to" think and the thinking processes that, through experience, they have learned are actually quite effective. Fourth, I want to take advantage of successful senior managers' experiences to explore the managerial implications of their thinking processes.

What they think about

Senior managers tend to think about two kinds of problems: how to

create effective organizational processes and how to deal with one or two overriding concerns or very general goals. These two domains of thought underlie the two critical activities in which John P. Kotter found general managers engaged: developing and maintaining an extensive interpersonal network and formulating an agenda.

The primary focus of on-line managerial thinking is on organizational and interpersonal processes. By "process" I mean the ways managers bring people and groups together to handle problems and take action.

Whether proposing a change in the executive compensation structure, establishing priorities for a diverse group of business units, consolidating redundant operations or preparing for plant closings, a senior executive's conscious thoughts are

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IN DEPTH/HOW MANAGERS THINK

foremost among the processes for accomplishing a change or implementing a decision: "Who are the key players here, and how can I get their support? Whom should I talk to first? Should I start by getting the production group's input? What kind of signal will that send to the marketing people? I can't afford to lose their commitment in the upcoming discussions on our market strategy."

During the first months of his tenure, one area general manager I studied asked all of his business unit management teams to evaluate their own units. Subsequently, the area manager and his staff spent a day or more with each team discussing the whole area, each business unit within it and how the two interrelated.

Although the area manager was concerned with the substance of the business-unit priorities, uppermost

Successful senior managers think a lot about interpersonal processes and the people with whom they come in contact. They try to understand the strengths and weaknesses of others, the relationships that are important to them and their agendas and priorities.

in his mind was a series of process concerns: How could the review process help managers be increasingly committed to their goals? How could the process help managers to become increasingly aware of the interdependencies among business units? How did his business unit managers use their people in reviewing their business units? How much management depth existed in the units?

In addition to thinking about organizational processes, successful senior managers think a lot about interpersonal processes and the people with whom they come in contact. They try to understand the strengths and weaknesses of others, the relationships that are important to them and what their agendas and priorities are.

For example, the CEO of a small

high-technology company spent more than an hour with his personnel director, a woman he rated as having performed excellently so far and whom he saw as having great potential although inexperienced. At the time of the discussion, the CEO was considering adopting a new top-management structure under which the personnel director would report to another staff member rather than directly to him.

The CEO explained the proposed change to the personnel director, pointing out that it was not definite and that he was soliciting her reactions. Managers' "maps" of people provide them with guides to action. In this case, because of his sense of the personnel director's needs, the CEO slowed the reorganizing process so that the people who reported to him could deal with the various issues that arose.

The CEO elaborately described to me his awareness of the personnel director's concern at being new and at being a woman, and her desire to be in direct contact with him. He also understood her worry that if she reported to someone lower than him, people would perceive that the new personnel function was not very important, and she would lose power.

Overriding concern

The stereotypical senior executive pays a great deal of attention to the strategy of the business, carefully formulates goals, lays out quantified and clear objectives and sets about to achieve these objectives in the most efficient way. Whereas senior executives certainly attend to specific strategies and objectives some of the time, in their day-to-day reality specific objectives lurk in the background, not in the forefront of their thoughts.

Approximately two-thirds of the senior managers I studied were preoccupied with a very limited number of quite general issues, each of which subsumed a large number of specific issues. This preoccupation persisted for anywhere from a month to several years and, when in effect, dominated the manager's attention and provided coherence to many of his chaotic and disorganized activities.

The general manager of one large division of an automotive company, for example, used the word "discipline" more than a dozen times in the course of a two-hour interview. For him, this concept embodied his deep concern for creating order and predictability in a division that, in his view, had become too loose before he took it over.

His concern for discipline appeared in a number of diverse actions — strongly discouraging his subordinates' fire-fighting mentality, criticizing their poor preparation for corporate reviews, introducing rigorous strategic planning, encouraging time management, putting out a yearly calendar with divisional and corporate meetings printed on it, publishing agendas for many of these meetings up to a year in advance and, by keeping recent reports in the top drawer of his desk, forcing himself to review frequently the division's activities and performance.

Regardless of its substance, the overriding concern weaves its way in and out of all the manager's daily activities, at times achieving the dimensions of an all-consuming passion.

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IN DEPTH/HOW MANAGERS THINK

After his first 100 days in office, an area general manager described his experience turning around a subsidiary in these words:

"The personal cost of achieving our top priorities has been huge. I dropped all outside activities. Now I have a feeling of just having emerged, like a chap who's been taken by a surf wave and rolled. Suddenly he comes up and can look at daylight again. It has been like a single-minded rage or madness. At the end of the 100 days, somehow I have awakened. It was overwhelming."

Of course senior managers do think about the content of their businesses, particularly during crises and periodic business reviews. But this thinking is always in close conjunction with thinking about the process of getting others to think about

the business. In other words, even very senior managers devote most of their attention to the tactics of implementation rather than the formulation of strategy.

How managers think

In making their day-by-day and minute-by-minute tactical maneuvers, senior executives tend to rely on several general thought processes such as using intuition; managing a network of interrelated problems; dealing with ambiguity, inconsistency, novelty and surprise; and integrating action into the process of thinking.

Generations of writers on the art of management have recognized that practicing managers rely heavily on intuition. In general, however, people have a poor grasp of what intuition is. Some see it as the opposite of

rationality, others use it as an excuse for capriciousness, and currently some view it as the exclusive property of a particular side of the brain.

Senior managers use intuition in at least five distinct ways. First, they intuitively sense when a problem exists. The chief financial officer of a leading technical products company, for example, forecast a difficult year ahead for the company and, based on a vague gut feel that something was wrong, decided to analyze one business group. "The data on the group was inconsistent and unfocused," he said after doing the analysis. "I had the sense that they were talking about a future that just was not going to happen, and I turned out to be right."

Second, managers rely on intuition to perform well-learned behavior patterns rapidly. Early on, man-

agerial action needs to be thought through carefully. Once the manager is fluent at performance, however, and the behavior is programmed, executives can execute programs without conscious effort. In the words of one general manager:

"It was very instinctive, almost like you have been drilled in close combat for years and now the big battle is on, and you really don't

After a while a manager can perform a sequence of actions in a seamless fabric of action and reaction without being aware of the effort.

have time to think. It's as if your arms, your feet and your body just move instinctively. You have a preoccupation with capital expenditures, a preoccupation with people and one with productivity, and all this goes so fast that you don't even know whether it's completely rational or it's part rational, part intuitive."

Intuition here refers to the smooth automatic performance of learned behavior sequences. This intuition is not arbitrary or irrational but is based on years of painstaking practice and hands-on experience that builds skills. After a while a manager can perform a sequence of actions in a seamless fabric of action and reaction without being aware of the effort.

A third function of intuition is to synthesize isolated bits of data and experience into an integrated picture, often in an "aha!" experience. In the words of one manager: "Syncretism is always nonrational because it takes you beyond the mere sum of the parts. It is a nonrational, nonlogical thinking perspective."

Fourth, some managers use intuition as a check (a belt-and-suspenders approach) on the results of more rational analysis. Most senior executives are familiar with the formal decision analysis models and tools, and those that occasionally use such systematic methods for reaching decisions are leery of solutions that these methods suggest that run counter to their sense of the correct course of action.

Conversely, if managers completely trusted intuition, they'd have little need for rigorous and systematic analysis. In practice, executives work on an issue until they find a match between their "gut" and their "head." One manager explained to me, "Intuition leads me to seek out holes in the data. But I discount casual empiricism and don't act on it."

Fifth, managers can use intuition to bypass in-depth analysis and move rapidly to come up with a plausible solution. Used in this way, intuition is an almost instantaneous cognitive process in which a manager recognizes familiar patterns. In much the same way that people can immediately recognize faces that were familiar years ago, administrators have a repertoire of familiar problematic situations matched with the necessary responses. As one manager explained:

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IN DEPTH/HOW MANAGERS THINK

"My gut feeling points me in a given direction. When I arrive there, then I can begin to sort out the issues. I do not do a deep analysis at first. I suppose the intuition comes from near tissue, getting burned enough times. For example, while discussing the European budget with someone, suddenly I got the answer: It was hard for us to get the transfer prices. It rang a bell, then I ran some quick checks."

By now it should be clear that intuition is not the opposite of rationality, nor is it a random process of guessing. Rather, it is based on extensive experience both in analysis and problem solving and in implementation, and to the extent that the lessons of experience are logical and well-founded, then so is the intuition. Further, managers often combine gut feeling with systematic

analysis, quantified data and thoughtfulness.

It should also be clear that executives use intuition during all phases of the problem-solving process: problem finding, problem defining, generating and choosing a solution and implementing the solution. In fact, senior managers often ignore the implied linear progression of the rational decision-making model and jump opportunistically from phase to phase, allowing implementation concerns to affect the problem definition and perhaps even to limit the range of solutions generated.

Problem management

Managers at all levels work at understanding and solving the problems that arise in their jobs. One distinctive characteristic of top managers is that their thinking deals not

with isolated and discrete items but with portfolios of problems, issues and opportunities in which many problems exist simultaneously. These problems compete for some part of the manager's immediate concern, and the issues are interrelated.

The cognitive tasks in problem management are to find and define good problems, to map these into a network and to manage their dynamically shifting priorities. For lack of a better term, I call this the process of problem management.

Defining the problem. After learning of a state health organization threat to exclude one of its major products from the list of drugs for which the state would reimburse buyers, top executives in a pharmaceutical company struggled to find a proper response. After some time, the managers discovered that the

real problem that was not the alleged drug abuse but the availability of the drug on the street caused. Rather, the problem was budgetary: The health services department had to reduce its budget drastically and was doing so by trimming its list of reimbursable drugs. Once they redefined the problem, the pharmaceutical executives not only could work on a better, more real problem, but also had a chance to solve it — which they did.

In another case, a division general manager discovered that, without his knowledge but with the approval of the division controller, one of his vice-presidents had drawn a questionable personal loan from the company. The division manager told me how he defined the problem: "I could spend my time formulating rules to guide managers. But the real fundamental issue here was that I needed to expect and demand that my managers manage their resources effectively." Although he recognized the ethical components involved, he chose to define the problem as concerned with asset management rather than cheating. Because asset management was an issue the division frequently discussed, the manager felt that it was more legitimate and efficacious to define the problem in this way.

Making a network of problems. By forming problem categories, executives can see how individual problems interrelate. For instance, a bank CEO had a network of at least 19 related problems and issues that he

(Continued on ID/38)



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Some good and bad news about cognition

Although the study of cognition is not new, in the past 30 years the popularity and practical importance of the cognitive sciences have increased dramatically, adding to our knowledge of the capabilities and limitations of the human mind. The news is both "good" and "bad" in

terms of our accuracy as judges and decision makers.

The good news is that each of us possesses a wide range of cognitive capabilities, including many that even the most powerful computers cannot match. For all intents and purposes, the long-term storage capacity of

the human memory is unlimited, capable of storing perhaps trillions of bits of information.

Furthermore, much of this memory is almost immediately accessible.

The human mind is also capable of performing very complicated simulations,

such as giving directions to someone on how to get to an office from an airport or rehearsing an upcoming meeting. We are also capable of making huge inferential leaps with rarely a hitch.

Try interpreting the following sentences: "The manager prepared the forecast

using an accepted inflation estimate. He knew that it was imprecise but figured that it was better than no projection at all." Who is he? What is "it"? What does "projection" refer to? We know what these sentences mean, yet to interpret them correctly required the reader to make a number of inferences, which he usually makes with unhesitating accuracy.

Finally, we are capable of using our unlimited memory, our rapid retrieval system and our unconscious rules of inference to attain extremely high levels of skill, such as playing chess, analyzing stocks, conducting performance appraisals or speaking a language. These skills do not come easily, requiring years of experience and many thousands of hours of practice.

Nevertheless, when we use them we compress years of experience and learning into split seconds. This compression is one of the bases of what we call intuition as well as of the art of management.

The same cognitive processes that underlie our greatest mental accomplishments also account for incorrigible flaws in our thinking. For instance, we easily believe that salient events occur more frequently than they really do.

For example, despite the fact that dozens of examples exist where missed budgets did not lead to termination, managers interpret Sam's being fired for not making a budget as, "There is a good chance that division heads who do not meet budgeted profit objectives will get axed."

Hindsight bias

A second family of flaws arises from our overconfidence in our own expertise at making complex judgments. Various cognitive biases such as the "hindsight bias," our retrospective confidence in judgments that we hesitated about making at the time ("I knew it wouldn't work when she first proposed it"), and our tendency to search for confirming but not for disconfirming evidence of our judgments, conspire to exaggerate that belief.

And finally, research has shown that when presented with data, we are not very good at assessing the degree of relationship among variables — even though this skill is critical for successful management. Unless the relationships are very obvious, we tend to rely on preconceptions and perceive illusory correlations.



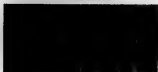
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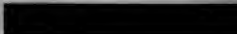


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IN DEPTH/HOW MANAGERS THINK

(Continued from D/30) was concerned about. Among these were: establishing credibility in international banking, strengthening the bank's role in corporate banking, increasing the range of financial services and products, being prepared to introduce new products in response to competitors' innovations, developing systems to give product cost information, reducing operational costs, standardizing branch architecture and utilizing space efficiently.

The bank CEO classified these problems in terms of broad issue categories. He found that many were related to the issue of expanding and broadening the bank's competence beyond consumer banking in which it was already firmly established. A second overarching issue was standardization of the bank's many branches with regard to architecture, physical layout, accounting systems and so on.

Having an interrelated network of problems allows a manager to seize opportunities more flexibly and to use progress on one problem to achieve progress on another, related issue. The bank CEO likened himself to a frog on a lily pad waiting for the fly — the problem or issue — to buzz by. Having a mental network of problems helped him to realize the opportunities as they occurred.

Choosing which problem to work on. Although managers often decide to work on the problem that seems to offer the best opportunities for attack, determining which problems they ought to tackle can be hard. One manager commented:

"I have to sort through so many issues at once. There are 10 times too many. I use a number of defense mechanisms to deal with this overload — I use delaying actions, I deny the existence of problems or I put problems in a mental queue of sorts. This is an uncomfortable process for me. My office and responsibility say I need to deal with all of these issues, so I create smoke or offer some grand theory as my only way to keep my own sanity. One of the frustrations is that I don't want to tell my people that their number one problems have lower priorities than they think they should get."

In my observations, how managers define and rank problems is heavily influenced by how easy the problems are to solve. Very shortly after perceiving that a problem exists, managers run a quick feasibility check to see if it is solvable.

Only if they find it is solvable will they then invest further energy to understand its various ramifications and causes. In other words, managers tend not to think very

much about a problem unless they sense that it is solvable. Contrary to some management doctrines, this finding suggests that a general concept of what is a possible solution often precedes and guides the process of conceptualizing a problem.

Thus, the two stages of problem analysis and problem solving are tightly linked and occur iteratively rather than sequentially. By going back and forth between these two cognitive processes,

managers define the array of problems facing them in terms that already incorporate key features of solutions and thus make it easier for them to take action.

Mental map

One outcome of this process is that managers have an organized mental map of all the problems and issues facing them. The map is neither static nor permanent; rather, managers continually test, correct and revise it. In

the words of one CEO, the executive "takes advantage of the best cartography at his command but knows that that is not enough. He knows that along the way he will find things that change his maps or alter his perceptions of the terrain. He trains himself the best he can in the detective skills. He is endlessly sending out patrols to learn greater detail, overlying targets to get some sense of the general battlefield." **Tolerating ambiguity.**

The senior managers that I observed showed an ability to tolerate and even thrive on high degrees of ambiguity and apparent inconsistency. One top executive said:

"I think ambiguity can be destroying, but it can be very helpful to an operation. Ambiguities come from the things you can't spell out exactly. They yield a certain freedom you need as a chief executive officer not to be nailed down on everything. Also, certain people thrive

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IN DEPTH/HOW MANAGERS THINK

Rather than deny, downplay or ignore disconfirmation, successful senior managers often treat it as friendly and, in a way, cherish the discomfort surprise creates.

on ambiguity, so I leave certain things ambiguous. The fact is we tie ourselves too much to linear plans, to clear time scales. I like to fuzz up time scales completely."

Because demands on a manager become both stronger and more divergent as responsibility increases, the need to tolerate apparent ambiguity and inconsistency also increases. For example, the top manager has to deal with stakeholders who may have adversarial roles. By

responding positively to one set of demands, the manager automatically will create other conflicting sets of demands.

The reason I have called the inconsistency "apparent" is that senior managers tend to have ways of thinking that make issues seem less inconsistent. For example, the president of a leading high-technology company was considering whether to exercise or forgo an option to lease land on which to

build expensive warehouse facilities on keeping the division at the same time as the division was laying off workers for the first time in its history.

"To spend a half-million dollars on keeping the land and building warehouse space while the plant is laying off people looks terrible and makes no sense," he said, "but if next year is a good year, we'll need to be in a position to make the product."

Perceiving and understanding novelty. The managers I observed dealt frequently with novel situations that were unexpected and, in many cases, were impossible to plan for in advance. For example, one division general manager found himself with the task of selling his division, which was still developing a marketable product.

In response to its shareholders, the corporation had shifted its strategy and then decided to divest the fledgling division. How should the general manager look for buyers? If buyers were not forthcoming, would the corporation retain a stake to reduce the risk to potential new partners? How should he manage his people in the process of selling? Should he, himself, look for a new position or commit himself to a new owner? These were some of the unique questions the division head faced while selling his own division, and there was no industry experience to give him clear answers.

In general, the human mind is conservative. Long after an assumption is outmoded, people tend to apply it to novel situations. One way in which some of the senior managers I studied counteracted this conservative bent is by paying attention to their feelings of surprise when a particular fact does not fit their prior understanding and then by highlighting, rather than denying, the novelty.

Although surprise made them feel uncomfortable, it made them take the issues seriously and inquire into it — "What is behind the personal loan by my vice-president of sales that appears on the books? How extensive a problem is it?" "Why did the management committee of the corporation spend more than an hour of its valuable time discussing a problem three levels down in my division?" "Now that we've shown the health services department beyond a reasonable doubt that this drug is not involved in drug abuse, why don't they reinstate it on the list?"

Rather than deny, downplay or ignore disconfirmation, successful senior managers often treat it as friendly and, in a way, cherish the discomfort surprise

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IN DEPTH/HOW MANAGERS THINK

creates. As a result, these managers often perceive novel situations early on and in a frame of mind relatively undistorted by hidebound notions.

What to do

Having looked at the inner workings of the managerial mind, what insights can we derive from our observations? Literally hundreds of laboratory and field studies demonstrate that the human mind is imperfectly rational, and dozens of additional articles, offering arguments based on every field of study from psychology to economics, explain why. The evidence that we should curtail our impractical and overly ambitious expectations of managerial rationality is compelling.

But is it possible for imperfectly rational managers to design even more perfectly rational systems? The answer is a qualified yes. There is evidence that with help people can design systems that are better than they are at making judgments.

Yet abandoning the rational ideal leaves us with two glaring problems. First, whether managers think in a linear and systematic fashion or not, companies still need to strive toward rational action in the attainment of corporate goals, particularly in their use of resources. Second, we still need to spell out what kinds of thinking processes are attainable and helpful to senior managers.

Of course, rationality is desirable and should be manifest in the functioning of the company. One alternative to the vain task of trying to rationalize managers is to increase the rationality of organizational systems and processes.

Although organizational behavior is never completely rational, managers can design and program processes and systems that will approach rationality in resource allocation and

employment.

Decision support systems are one source of organizational rationality. These generally computerized routines perform many functions ranging from providing a broad and quantitative data base, to presenting that data base in easily understandable form, to modeling the impact of decisions on various financial and other criteria, to misdirecting expert judgment such as in the diagnosis and repair of malfunctioning equipment or in oil field exploration.

Strategic planning

Another rational process that many businesses employ is strategic planning. Nonrational or partly rational managers can devise, implement and use a plan that systematically assesses a company's strengths and weaknesses, logically extrapolates a set of its competencies, proposes a quantitative assessment of environmental constraints and resources and performs all these tasks in a time-sequenced, linear fashion. Of course, companies have used rational systems for information gathering, strategic planning, budgeting, human resource planning, environmental scanning and so forth for a long time. But I see these systems not only as useful but also as a necessary complement to a manager's apparent inability to be very systematic or rational in thought.

But is it possible for imperfectly rational managers to design even more perfectly rational systems? The answer is a qualified yes. There is evidence, for example, that with

help people can design systems that are better than they themselves are at making judgments.

Creating organizational systems to improve on their own behavior is not new to managers. In order to still hear the beautiful sirens yet prevent himself from being seduced by the music and throwing himself into the sea, Ulysses ordered his men to block their own ears with wax, bind him to the mast and to tighten his bindings if he ordered them to let him go. Although Ulysses begged his sailors to release him, they obeyed his original orders, and Ulysses succeeded in both hearing the sirens and surviving their perilous allure.

Programming rationality into the organizational functioning is important for another reason: Rational systems free senior executives to tackle the ambiguous, ill-defined tasks that the human mind is uniquely capable of addressing. Many senior managers today face problems — developing new products for embryonic markets, creating new forms of manufacturing operations, conceiving of innovative human resource systems — that are new to them and new to their companies and that they can deal with only extemporaneously and with a non-programmable artistic sense. In fact, it may even seem paradoxical that managers need to create rational systems in order to tackle creatively and incrementally the nonrecurrent problems that defy systematic approaches.

In the literature on managerial behavior, there is disagreement as to



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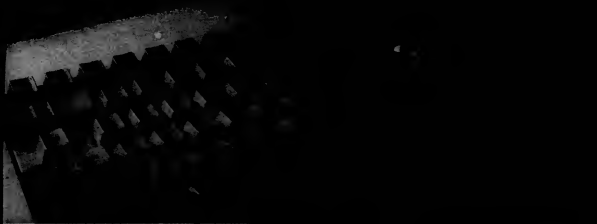
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IN DEPTH/HOW MANAGERS THINK

Given the great uncertainty of many of the management or business issues that they face, senior managers often instigate a course of action simply to learn more about an issue

how much or how often senior managers engage in thoughtful reflection. Many executives that I studied do make time for in-depth thinking, sometimes while they are alone, sometimes with their peers or subordinates and sometimes in active experimentation.

Furthermore, most senior managers I studied constantly maintain and sharpen their intellectual abilities in order to better analyze their current or past experiences.

Rigorous thinking is a way of life for them, not a task they try to avoid or expedite superficially.

These senior managers read books outside their fields, engage in enthusiastic discussions of political and economic affairs, attend academic lectures and management seminars and tackle brain teasers such as word problems, chess and crossword puzzles. One company president I studied is a regular theatergoer, who can dis-

cuss Shakespearean and contemporary plays at great length, while another often immerses himself in classical music and allows ideas about difficult work-related issues to float around in his consciousness.

These activities are valuable only for their content but also for the thinking processes that they establish, develop and refine.

Whether managers indulge in such blue-sky, irrelevant activities at work or outside, they are developing critical mental resources that they can then apply to problems that arise in their jobs.

One of the implications of the intuitive nature of executive action is that "thinking" is inseparable from acting. Since managers often

"know" what is right before they can analyze and explain it, they frequently act first and think later. Thinking is inextricably tied to action in what I call thinking/acting cycles, in which managers develop thought about their companies and organizations not by analyzing a problematic situation and then acting, but by thinking and acting in close concert. Many of the managers I studied were quite facile at using thinking to inform action and vice versa.

Given the great uncertainty of many of the management or business issues that they face, senior managers often instigate a course of action simply to learn more about an issue: "We bought that company because we wanted to learn about that business." They then use the results of the action to develop a more complete understanding of the issue. What may appear as action for action's sake is really the result of an intuitive understanding that analysis is only possible in the light of experience gained while attempting to solve the problem. Analysis is not a passive process but a dynamic, interactive series of activity and reflection.

One implication of acting/thinking cycles is that action is often part of defining the problem, not just of implementing the solution. Frequently, once they had begun to perceive the symptoms, but before they could articulate a problem, the managers I studied talked to a few people to collect more information and confirm what they already knew.

The act of collecting more data more often than not changed the nature of the problem, in part because subordinates then realized that the problem was serious enough to warrant the boss's attention. Managers also often acted in the absence of clearly specified goals, allowing these to emerge from the process of clarifying the nature of the problem.

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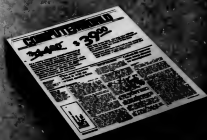
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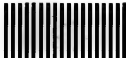
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IN DEPTH/HOW MANAGERS THINK

Yet how often do managers push their subordinates to spell out their goals clearly and specify their objectives? A creative subordinate will always be able to present a plausible and achievable goal when pressed, but in the early stages of a tough problem it is more helpful for managers to provide a receptive forum in which their people can play around with an issue, "noodle" it through and experiment. Sometimes it will be neces-

sary for managers to allow subordinates to act in the absence of goals to achieve a clearer comprehension of what is going on and even at times to discover rather than achieve the organization's true goals.

All managers would like to accomplish more in less time. One of the implications of the process of mapping problems and issues is that when a manager addresses any particular problem, he calls a number of related

problems or issues to mind at the same time. One by-product is that a manager can attain economies of effort.

For example, when working on a problem of poor product quality, a division manager might see a connection between poor quality and an inadequate production control system and tackle both problems together. To address the issues, he could form a cross-functional task force involving his marketing manager, who under-

stands customers' tolerance for defects. (One reason for bringing him in might be to prepare him for promotion in two or three years.) The manager might intend the task force to reduce interdepartmental conflicts as well as prepare a report that he could present to corporate headquarters.

Managers can facilitate the process of creating a problem network in many ways. They can ask their staff to list short- and long-

term issues that they think need to be addressed, consolidate these lists and spend some time together mapping the interrelationships. Or they can ask themselves how an issue fits into other non-problematic aspects of the company or business unit. How does product quality relate to marketing strategy?

To critical expenditures? To capital expenditures? To guidelines? To the company's research and development center with a budget surplus? To the new performance appraisal system? To the company's recent efforts in affirmative action? To their own career plans?

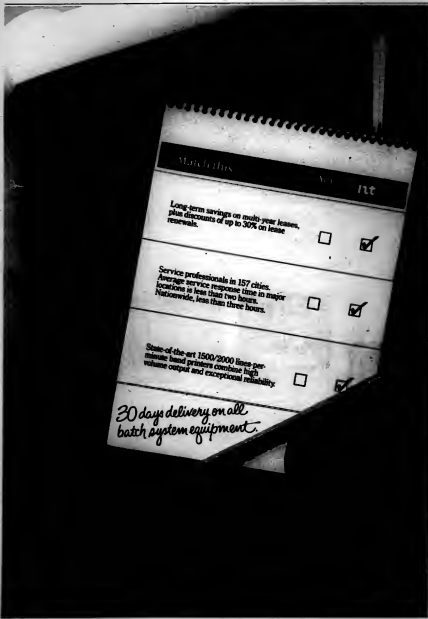
Managers should never deal with problems in isolation. They should always ask themselves what additional related issues they should be aware of while dealing with the problem at hand.

Some suggestions

These suggestions on how managers can improve their thinking emerge from my study of senior managers' thought processes:

- Bolster intuition with rational thinking. Recognize that good intuition requires hard work, study, periods of concentrated thought and rehearsal.
- Offset tendencies to be rational by stressing the importance of values and preferences, of using imagination and of acting with an incomplete picture of the situation.
- Develop skills at mapping an unfamiliar territory by, for example, generalizing from facts and testing generalities by collecting more data.
- Pay attention to the simple rules of thumb — heuristics — that you have developed over the years. These can help you bypass many levels of painstaking analysis.
- Don't be afraid to act in the absence of complete understanding, but then cherish the feelings of surprise that you will necessarily experience.
- Spend time understanding what the problem or issue is.
- Look for the connections among the many diverse problems and issues facing you to see their underlying relationships with each other. By working on one problem you can make progress on others.
- Finally, recognize that your abilities to think are critical assets that you need to manage and develop in the same way that you manage other business assets. †

About the author
Daniel Lornberg is assistant professor of business administration at the Harvard Graduate School of Business Administration. He is currently completing a study of the thinking processes used by 18 divisions, heads in six corporations.



IN DEPTH



IBM's Information Quality Analysis

By John Vacca

IBM's Information Systems Services brought out a service last August called Information Quality Analysis (IQA), an automated version of its Business Systems Planning (BSP) strategic planning methodology.

The IQA process, like its predecessor, examines the flow of data and information used to make decisions in an organization and attempts to identify data that is missing, inaccurate, late, incomplete, underautomated or improperly distributed.

As in BSP, the data input for the IQA process is provided by joint user, management and information system department participation. However, with IQA, the analysis itself is assisted by IBM simulation software, providing for

more rapid diagnosis of problem areas and allowing for faster formulation of an information systems plan that addresses both short- and long-term needs. The analysis is intended to provide, within a few weeks, the critical facts needed to improve the quality of information.

IQA was developed by IBM Belgium and has been used by more than 400 European and U.S. customers during the past five years. After having been performed at several U.S. pilot locations and inside IBM, the service is now available to IBM customers who need to bring their information systems activities in line with their current business operations and plans.

An IQA is led by an IBM Information

IN DEPTH/INFORMATION QUALITY ANALYSIS

Systems Services team leader and staffed by its customer and services personnel. The studies take five to seven weeks and produce reports on the quality of data in each functional area of the corporation as well as recommendations for improvement.

Even though IQA is similar to the BSP process, it takes considerably less time and is supported by an integrated set of APL programs called Panda. The Panda software automates the data entry, data base creation, data manipulation and data analysis functions.

This software, which runs under the VM/CMS and MVS/TSO environments, is part of the IQA service offering and is not available as a separate program product.

In addition to assisting in the development of a strategic plan, the data collected can provide information for the development of applications and data architectures.

A study team composed of IBM customer executives and Information Systems Services representatives conduct group session interviews to identify user information needs and evaluate user satisfaction with existing data.

From the information supplied and analyzed, the study produces statistics on how IBM customer personnel view the data they use to make decisions. These statistics might include the following:

- The amount of essential vs. nonessential data.

- The amount of computerized vs. noncomputerized data.

- An analysis of the quality of the data; for example, the amount of data deemed satisfactory and the amount of data adversely criticized or missing.

For the unsatisfactory data, the IQA identifies problems with reliability, content, delays and missing items. This analysis points to problem areas and helps to identify work to be done.

Objectives of IQA

The most common objective of an IQA is to provide critical information for the formulation of a strategic plan for information systems. While most executives would agree that information systems are essential for effectively managing their business, these systems must work in concert with the overall business plan in order to achieve their objective of being a real business asset.

An IQA can be an important step to ensure that the goals and plans of the business are accurately reflected in the information system department strategic plan.

Companies can obtain the following benefits:

- Executives can become confident that the informa-

tion systems department's strategic plan is in concert with the business plan.

- A nonorganizational view of the business, which is based on information and information flow, may broaden the perspective of the IQA participants.

- IQA results can be used for specific actions tailored to an individual company's situation. It can serve as the starting point for reorganizations, staff reductions, redefinition of roles and responsi-

bilities and other actions that might benefit an entire organization.

- The IQA is conducted by personnel of the enterprise being studied. It is guided by the IBM consultants and aided by a computer program used to assist in the diagnosis of the data collected. The analysis is, therefore, internal and also possesses a high degree of objectivity. It is built on business processes and information flow that are independent of organiza-

tional structures and personnel and political pressures.

IQA methodology

The IQA study has four phases. Phase 1 is called the enterprise analysis. The objective of this phase is to identify the following:

- Business processes of the company.

- People who should be interviewed who can identify the information required to exercise the business processes.

- The data classes into which the identified information may be categorized.

The personnel involved in this phase are the IQA consultant (the IBM person responsible for directing the analysis), the consultant's assistants and the IQA team (the customer managers who report to the sponsor). The IQA administrator (the customer representative responsible for interacting with IBM on a day-to-day basis) and administrative

IN DEPTH/INFORMATION QUALITY ANALYSIS

assistants are needed in this phase to handle calendar, logistics and secretarial work.

This phase generally requires a full 40-hour week of commitment by all participants. An off-site location is desirable.

Phase 2 is called the enterprise survey. The enterprise survey phase is divided into five parts:

- General briefing.
- Group interviews.
- Data entry.
- Validation.

■ Data encoding.

The general briefing is conducted by the sponsor (the customer representative who has commissioned the IQA) and the IQA consultant for all of the interviewees (customer personnel) selected during the enterprise analysis phase who are representative of the people who perform each business process). This one-hour meeting has as its objective the motivation of the interviewees and an explanation of their role and

their responsibilities.

The group interviews are conducted by the IQA consultant or consultant assistant. Six interviewees should be in attendance and one IQA team member. The objective of this two-day interview is to have each interviewee identify the business processes in which he is involved and identify the information he requires for each of those processes.

In addition, the interviewees also critique the informa-

tion. The IQA team member records the business process of origin for the information items identified and the data class of the information. Motivation, clarification and continuity are also supplied by this high-level manager.

Data entry is organized and supervised by the customer administrative assistants. Information collected on forms during the group interviews is entered on IBM 3270 terminals using Panda, the API program tool. Ap-

proximately three hours of data entry time per interviewee is required. Data entry should be started immediately after each group interview is completed.

Validation is accomplished through the use of Panda, which will print a detail of each interviewee's responses. This report is reviewed by the interviewee and returned so corrections can be made by data entry personnel.

Data encoding occurs after all the group interviews have been completed. The objective of this two-day process is to normalize the information items identified. Normalization is accomplished by collecting the data class information accumulated by the IQA leaders during the group interviews and assigning a unique information item code to each unique piece of information identified. This information and the origin process codes are then entered using Panda.

Phase 3 is the study diagnosis. It begins with the IQA consultant using Panda to produce some initial statistics and matrices and to cluster the business processes into subsystems based on an analysis of the relative strength of information exchange. These findings are presented to the IQA team, which will spend from two to five full days together with the IQA consultant doing its own analysis.

Additional computer runs are common during this phase. The diagnosis concludes with the development of an action plan by the IQA team and the designation of a member to draft a final report to be presented to the sponsor. An abbreviated feedback report to the interviewees is also recommended.

Phase 4 is called the IQA management report. A summary is drafted by one of the IQA team members. At a half-day meeting, this report is reviewed by the assembled IQA team. A presentation to the sponsor is made in the presence of the IQA team shortly thereafter.

The benefits of IQA extend beyond the formalized strategic plan and other action plans formulated by the IQA team. Going through the process has been identified as a benefit in itself. The introspective nature of the process stimulates each participant to reexamine his own roles and objectives, often giving rise to new energy and job interest.

About the author

John Vacca is a freelance writer and consultant in the area of information management and computer security. Vacca is a DP policy and systems analyst for Myers and Stauffer, CPA, in Topeka, Kan.

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COMMUNICATIONS

DATA STREAM/JOHN DIX

Application not equal to voice/data technology

The widespread integration of telephones with personal computers or terminals may be inevitable, but the products now available are still ahead of the market.

There are generally three types of voice/data integration products now available: telephone terminals like Northern Telecom, Inc.'s Displayphone; personal computer add-ons like Rolm Corp.'s Juniper and Wilcom, Inc.'s Asher; and telephone/personal computers like Rolm's Cedar.

Presumably, the integration of telephones with computers or terminals will serve to unclutter desks, enhance the functionality of the mated devices and pump up users' productivity — that elu-

sive measure by which so-called office automation devices are justified.

Unclutter desks? Possibly. Make the devices more functional? In some cases. Boost productivity? Only if you have to explain the purchase to your boss.

Ironically, telephone/terminals — an older technology never well received and presumably superseded by telephone/computers — may eventually prove to be the most useful and widely used device.

Consider the alternatives, like Rolm's Cedar. This device combines an IBM Personal Computer with a full-feature, multi-line digital phone and includes a speakerphone. Cedar's capabilities include Digital Equipment Corp. VT100 terminal compatibility, IBM 3270 emulation, com-

munications at speeds up to 19.2K bit/sec, prewired terminal protocol, single-button logic capabilities, telephone directory, one-button dialing and simultaneous voice/data support. This quaint, neatly packaged workstation costs \$4,245.

But who needs one? The price, roughly \$1,000 over a comparable personal computer (without the phone), would confine the device's market to managers who do not already have a personal computer and think a neat desk is worth the added expense.

Cedar does obviate the need for modems when interconnected over a special digital link with a Rolm private branch

See PW84 page 96

■ Interlan, Inc. announced products to interconnect two local-area networks and to manage networks/86

■ How Enterprises introduced software that transfers binary files over asynchronous lines from an IBM mainframe to an IBM Personal Computers/81

■ 3Com Corp. cut prices and announced enhancements for its line of Ethernet products/81

■ NEC America, Inc. introduced a multispeed, auto-dial modem and a modem for use with personal computers/81

INSIDE

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Voice/Data Communications/82

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Multiplexers/83

Modems/83

Local-Area Networks/83

Auxiliary

Equipment/86

PE adds Everywhere enhancements for IBM link

By James Connolly
OW Staff

OCEANPORT, N.J. — Perkin-Elmer Corp. today announced eight enhancements and new products for its Everywhere line of communications products designed to interconnect its own computers and IBM systems.

The announcements include Ethernet support for interconnection of PE 3200 series superminicomputers running the company's AT&T Unix-based operating system Xenix, additional communications capabilities for PE equipment connected to IBM Systems Network Architecture (SNA) systems, a terminal server that links RS-232C devices to Ethernet and an Ethernet link for the PE 7350A supermicrocomputer. That supermicro was also announced today (see story page 107).

The company said that its IEEE 802.3 Ethernet support for Xcelo-based systems appears to be unique in that it allows direct cabling of workstations to superminicomputers, the 3200 series running PE OS/32 and Xcelo, an operating system based on AT&T Unix System V. The support is through PE's Ethernet Data Link Controllers (EDLC), hardware interface and transceivers providing connection to Ethernet cable.

The Ethernet Terminal Server (ETS) reportedly enables devices such as terminals, personal computers and printers to access Ethernet through RS-232C interfaces. The ETS resides between Ethernet and the devices. It allows connection of up to 32 RS-232C devices in increments of eight through a single Ethernet interface. The company said the ETS handles Ether-

net addressing for the devices and allows users to access multiple hosts.

Penet Plus PE 7350A, a board for the PE 7350A, is said to allow the supermicro running the Unixsoft Corp. Unixplus port of AT&T Unix System III to access Ethernet and other portions of PE's Penet Plus networking product. Penet Plus, an open systems network, is said to allow connections through Ethernet, SNA, CCITT X.25 packet-switching and the International Standards Organization Open Systems Interconnection model.

PE, which last year introduced Penet Plus with support for Ethernet, SNA and IBM bisynchronous emulation, also announced in this release expanded SNA and bisynchronous support. This includes support of IBM SNA Host Command Facility

See PE page 92

BBN announces PAD line for IBM interfacing

CAMBRIDGE, Mass. — BBN Communications Corp., a subsidiary of Bolt Beranek and Newman, Inc., has announced a family of IBM-compatible packet assemblers/disassemblers (PAD) for interfacing IBM equipment with BBN Communications packet networks.

The Model C/10 PADs reportedly support IBM host and terminal equipment using IBM's System Network Architecture/Synchronous Data Link Control (SNA/SDLC), 3270 Bisynchronous, 2780/3870 Bisynchronous protocols and asynchronous transmissions.

The units are designed to attach directly to IBM equipment without modification to the existing IBM hardware and software. The C/10 PAD is said to support 32 ISL/SDLC synchronous multipoint lines and concentrate traffic over one or two X.25 links operating at up to 64K bit/sec.

The C/10 PAD was intended to allow dispersed IBM terminals and

hosts to communicate via a BBN Communications X.25 packet-switching network and to let users access multiple IBM hosts and applications from a single terminal.

Polling and selection of remote peripherals reportedly is performed locally by the C/10 PAD, eliminating polling traffic from the X.25 network. Monitoring and control of the C/10 PAD is said to be from a locally attached terminal or from a centralized network control facility. Remote diagnostics support is provided by a dedicated service port on all C/10 PADs, according to the vendor.

Modular design is said to allow the user to configure a C/10 PAD system with as few as four or as many as 32 host/terminal ports.

Delivery is scheduled for April. Price ranges from \$4,350 for a four-line configuration to \$24,500 for a 32-line configuration.

BBN Communications is located at 70 Fawcett St., Cambridge, Mass. 02138.

DEC launches Ethernet products for broadband nets

MAYNARD, Mass. — Digital Equipment Corp. has announced that it is the first computer manufacturer to offer full Ethernet functions, including a 10M bit/sec data rate over broadband cable.

The company introduced a broadband Ethernet transceiver called Decom and a broadband Ethernet frequency translator called Deftr. The products are said to enable up to 1,024 Ethernet nodes to be interconnected over a broadband net at distances up to 3,800 meters apart.

The products were designed to connect to DEC's Ethernet controllers for DEC VAX-11 superminicomputers, PDP-11 minicomputers and Professional 300 microcomputers. They also can be connected to DEC's router, gateway and terminal server products and the DEC Local-Area Interconnect (Deftr) clustering device.

The Decom and Deftr are targeted at installations using broadband cabling for video, data and voice communications and run under DEC's

Phase IV Decnet networking software.

Decom is said to be available for dual- and single-cable broadband installations and to provide connections for up to eight Decnet/Ethernet devices when used in conjunction with Deftr.

Deftr reportedly is used in conjunction with Decom in single-cable installations and lets Decom transmit at one set of frequencies and receive on another. The company said Deftr is unnecessary in dual-cable situations.

DEC's broadband products reportedly attach to conventional CATV cabling and components, use the Ethernet carrier-sense multiple access with collision detect protocol and require an 18 MHz bandwidth.

Decom and Deftr will be available in the spring of 1985. According to the company, Decom costs \$4,350, and Deftr costs \$4,500.

DEC is located in Maynard, Mass. 01754.

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COMMUNICATIONS

NAS gateway connects micros in dissimilar nets

By Jeffrey Bonker
CWI West Coast Bureau

MOUNTAIN VIEW, Calif. — National Advanced Systems Corp. (NAS) recently departed from its traditional product direction with the introduction of a Systems Network Architecture (SNA) gateway processor that reportedly permits communications between IBM Personal Computers and compatibles in dissimilar local networks.

The Advanced Systems (AS)/Gateway also enables the same personal computers to share modems and exchange data with host processors, according to Jerry Samstad, NAS' director of network systems.

Unlike NAS' IBM-compatible

mainframes and external storage modules, which originate in Japan, AS/Gateway is manufactured in the U.S. and is a product of the American vendor's own development efforts. The decision to produce the communications unit domestically allowed NAS to take advantage of the microprocessor expertise of its parent company, National Semiconductor Corp., Samstad said.

The SNA gateway processor is built around National Semi's 32016 microprocessor and consists of two printed circuit boards. One of the boards emulates IBM's 3274 remote cluster controller, manages all communications protocols in an SNA environment and directs all I/O traffic

entering or leaving a gateway, according to the vendor.

The other board manages Synchronous Data Link Control protocols and permits data to be passed back and forth between gateways and central mainframes, Samstad said.

Because it is compatible with the IBM Personal Computer's form-factor bus, AS/Gateway can accept various kinds of local networking interface boards, the vendor said. The NAS processor thus allows micros on, for example, a token-passing type of local network to communicate with personal computers connected through Ethernet, Samstad said.

In addition, AS/Gateway reportedly enables micro users to gain access

to both their own and other organizations' CPUs, whether housed locally or remotely.

Capable of operating in either an asynchronous or an SNA communications environment, the gateway permits local networks to share up to eight modems, with access to the devices allocated on a first-come-first-served basis, the vendor said.

AS/Gateway costs \$6,000 plus an additional \$125 for each personal computer node connection. Software maintenance and updates will sell for an additional \$1,000 per gateway, according to NAS.

NAS is headquartered at 800 E. Middlefield Road, Mountain View, Calif. 94040.

Interlan unveils internet router, network utility

WESTFORD, Mass. — Interlan, Inc. has announced two Ethernet network products, the Network Communications Server/Internet Router (NCS/IR), used to interconnect independent local networks, and the Network Management Utilities that runs on the IBM Personal Computer.

The NCS/IR is said to provide transparent data transmission for both interactive and file transfer sessions between two physically separate Ethernet local-area networks without the need to know the overall network topology.

Internet routing is reportedly done with XNS Internet Protocol. The internet router provides for asynchronous communications between networks supporting Interlan's NTS10 Terminal Servers and host Integrated Terminal Servers used with Digital Equipment Corp. VAX-11 systems running VMS, according to Interlan.

The internet router also allows Interlan's Ethernet Direct Connect for the IBM Personal Computer to access systems and resources on a remote Ethernet and supports file transfers between distributed personal computers, VAX-11 VMS and AT&T Unix systems.

The NCS/IR supports two 9.6K bit/sec links via an RS-232 interface or 224K bit/sec connections via V.35 or RS-449/RS-422 interfaces.

Scheduled for delivery this month, the 9.6K bit/sec connection NCS/IR costs \$6,650. The 224K bit/sec capability will be available at no incremental cost in the second quarter of 1985.

The Network Management Utilities reportedly provides the network operator with tools for controlling a collection of servers on Ethernet. They run on the IBM Personal Computer family and compatibles and allow the management station to service host requests from any server on the network.

The utilities include a controller board and diagnostic software. They are scheduled for shipment this month at \$1,000.

Interlan is located at 3 Liberty Way, Westford, Mass. 01886.

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COMMUNICATIONS

Binary file package debuts

PALO ALTO, Calif. — WOW Enterprises has introduced a software product said to permit the transfer of binary files between IBM mainframes and IBM Personal Computers over an asynchronous communications link.

The Missing (Azyne) Link is intended for use with the IBM 3101 Emulation Program and converts IBM CMS and TSO host files to and from the same transmission format that is supported by Fileconv, a utility supplied with the IBM program, the vendor said. The conversion is said to include data compression, cyclic redundancy checksum characters and efficient encoding of binary data as printable characters that require four characters to represent each 3-

byte group.

The program consists of host system programs for CMS and TSO that convert native host system files for transmission in Ascl over an asynchronous communications link, using the same encoded format that is used by the IBM 3101 Emulation Program for transmission of IBM Personal Computer files, the vendor said. The program is distributed on diskette and includes special procedures for installation of the object programs on CMS and TSO host systems from the IBM Personal Computer.

Price is \$96.

WOW Enterprises is located at 1500 Middlefield Road, Palo Alto, Calif. 94301.

3Com enhances Etherseries

MOUNTAIN VIEW, Calif. — 3Com Corp. has announced enhancements to its Etherseries local-area network software, an extended warranty on its Etherlink hardware and price reductions of 18% to 70%.

The Etherseries 2.4 enhancements include support for the IBM Personal Computer AT and the IBM PC-DOS Release 3.0 operating system; Ethermail, a menu system designed to restrict access to network functions and to allow custom-designed menus for frequently used applications; laser printer support; and an Ethershare upgrade that allows a standard mode server to support Ethermail, multiple third-party hard disks and connection between the local, user

and other servers.

The company said the warranty on the Etherlink network adapter has been increased from 90 days to one year. 3Com also said that the software warranties will remain at 90 days.

The price changes are Ethershare/PC, down from \$595 to \$395; Etherprint/PC, down from \$500 to \$150; Ethermail down from \$750 to \$550; and Etherlink down from \$785 to \$450.

Software upgrades for current users of Etherseries range from \$40 to \$90.

3Com can be reached at P.O. Box 7390, 1365 Shorebird Way, Mountain View, Calif. 94039.

NEC America offers autodial, micro modems

LAS VEGAS — At the recent Comdex/Fall '84 show, NEC America, Inc. unveiled two modems, a multiple-speed device with autodial and logon capabilities and another designed for personal computer use.

The NEC DSP2430II modem is said to be AT&T-compatible at 300 and 1,200 bit/sec and conform to the international CCITT V.22 standard at 2,400 bit/sec.

The autodial modem also has automatic logon capabilities and can store up to 12 numbers with optional logon messages. These logon commands can be protected with use of the device's password feature which can accommodate passwords of up to eight characters.

Used with PBX dialing

The device's ability to detect second dial tones enables the DSP2430II to be used with private branch exchange (PBX) dialing. The modem will be available in January at a price of \$1,095.

The NEC Data Modem N1230 is a 1,200 bit/sec full-duplex autodial modem said to be AT&T 212-compatible. It reportedly has a Hayes Microcomputer Products, Inc.-compatible mode that enables it to operate with the major data communications software available but has built-in intelligence and storage capabilities that make it suitable for use with terminals.

Users that need Hayes- or Apple Computer, Inc.-compatible modems can use the N1230 in conjunction with the appropriate software, enabling a personal computer to control the modem directly. The device is said to have storage enough for 12 telephone numbers with logon sequences.

Host of accessible features

A host of features, such as password security and number editing functions, are accessible from the personal computer keyboard.

Available in January, the N1230 will cost \$450 in single quantities, according to the vendor.

For more information, NEC America is located at 8 Old Sod Farm Road, Melville, N.Y. 11747.

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COMMUNICATIONS

CONTROLLERS

NCR COMTEN, INC.
Comten T-7362

NCR Comten, Inc. has introduced a disk for its 3690 communications processor systems that reportedly stores system software load modules and memory dumps.

According to the company, the Comten T-7362 is a 29M-byte integrated fixed-disk drive that can capture data when the system fails and restore a downed system by automati-

cally reloading the communications processor. Console commands can be issued to the disk to display a table of contents, delete any file, format a disk or display disk file records, the company said. The disk reportedly can be installed into any Comten 3690 communications processor running under the Comten COS/32/90 communications operating system.

The price of the product, including one 29M-byte disk drive, controller and interface adapter is \$4,450, according to the vendor.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

VOICE/DATA
COMMUNICATIONSWESTERN TELEMATIC, INC.
SS-16

Western Telematic, Inc. has announced a 16-port, SS-232 smart switching device designed to let users create their own port-to-port local network.

The SS-16 reportedly allows computer port expansion, computer sharing and linking of terminals, modems, printers and computers.

It is said to use menu-driven commands for selecting ports, disconnecting and displaying port activity.

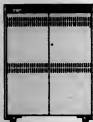
Each of the ports can be configured for independent transmission rates from 150 bit/sec to 19.2K bit/sec. Parity conversion and handshake protocol and ports can be selected by number, name or group with up to eight simultaneous connections, according to a spokesman for the vendor.

It costs \$1,895.

Western Telematic, 2435 S. Anne St., Santa Ana, Calif. 92704.

See VOICE page 93

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PE from page 87

(HCF) and Distributed Systems Executive (DSX) applications for its Series 3200 systems.

The HCF Support software package running on the Series 3200 reportedly allows a local or remote IBM 3270 terminal in an IBM SNA network to interact with applications on the Series 3200 and to use Pennet functions. It is intended primarily to give system programmers at the IBM host site access to remote processors.

The DSX Support package is said to enable IBM host-initiated sequential file transfers between a Series 3200 and an IBM 370, 30 series or 4300 host. The 3200 is said to be managed by the IBM host as if it were an IBM 3100 distributed processing system.

The company also announced IBM 3270 terminal support, allowing connection of IBM SNA 3270 and IBM B-synchronous 3270 terminals to a 3200 series processor via an IBM cluster controller. The support products are said to allow access to applications on the PE host or pass through to an IBM host.

Pricing for the software products are according to the size of the 3200 series processor they will run on. All except SNA/3270 Support, which will be available in January, are available now.

The original license for SNA/HCF Support costs from \$1,600 to \$4,500, and additional copies cost from \$600 to \$1,600. SNA/DSX Support costs from \$1,000 to \$3,000 for the original license and from \$300 to \$1,000 for copies. SNA/3270 Support is from \$1,600 to \$5,000 for the original license and from \$600 to \$1,600 for copies; and BSC/3270 Support is from \$1,400 to \$4,300 for the original and \$500 to \$1,400 for copies.

Pennet Plus PE 7350A is now available for \$500.

EDLC-Xerox, scheduled for February deliveries, costs \$3,700.

EDLC-PE 7350A, available now, costs \$1,000.

The Ethernet Terminal Server, now available, costs \$4,500 for the terminal portion and \$5,500 for the host connection.

PE is located at 2 Crescent Place, Oceansport, N.J. 07767.

VOICE

Start page 92

MICOM SYSTEMS, INC.

Micro800/X.25i

Micom Systems, Inc. has introduced its Micro800/X.25i concentrator packet assembler/disassembler (PAD). The integral PAD lets Micom's Micro800 data private branch exchange-based instant local-area network users utilize X.25 networks to link their Micro800s to terminals, computers and other Micro800s.

The Micro800/X.25i can communicate with local host computers supporting X.25 software, providing up to 16 full duplex logical data channels over a single hard-wired connection to one X.25-supported computer port. Compatible with CCITT X.3, X.25, X.28 and X.29, the Micro800/X.25i supports both permanent and switched virtual circuits, plus fast select, abbreviated calling and closed user groups.

An eight-channel Micro800/X.25i is priced at \$2,500, and a 16-channel version costs \$4,200.

Micom Systems, 20151 Nordhoff St., Chatsworth, Calif. 91311.

PROTOCOL CONVERTERS

INNOVATIVE ELECTRONICS, INC.

MC 880 protocol converter

Innovative Electronics, Inc., has

announced a protocol converter that is said to allow up to 24 asynchronous Asci devices to communicate with an IBM mainframe or host computer using either Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) or Binary Synchronous Communications (BSC) protocols.

According to the company, the MC 880 appears to the host computer as an IBM 3274 or 3278 communications controller with IBM 3278/3279 terminals attached. The product is designed for computer facilities that have numerous remote sites employing only one or two 3270 terminals per site. Remote terminals, connected via asynchronous modems, can time-share a MC 880 at the main computer site, the company said.

The product reportedly comes in port configurations of up to 24 ports and supports more than 100 types of asynchronous terminals. The MC 880 is said to be user-configurable to support all standard asynchronous bit/sec rates up to 19.2K bit/sec.

The price of the product is \$3,600 for the five-port unit, according to the vendor.

Innovative Electronics, 4714 N.W. 16th St., Miami, FL 33014.

MULTIPLEXERS/MODEMS

RACAL-MILGO, INC.

Planet Starter Pack

Racal-Milgo, Inc. has introduced a

starter pack designed to create an expandable local-area network linking up to 10 word processors and personal computers.

The Private Local-Area Network (Planet) Starter Pack reportedly includes the cables, hardware and documentation needed to support up to 10 asynchronous or synchronous communications devices. According to the company, asynchronous and synchronous devices may be on the same network but not interconnected.

The network was designed to allow expansion to Racal-Milgo's Planet network with a capacity of 250 stations.

It also is said to offer Planet's features, including port selection, queuing, resource sharing, closed user groups, password, priority and automatic network restoration after a power failure.

Using a token-ring configuration with baseband, the Planet Starter Pack features a 19.2K bit/sec transfer rate and supports RS-232C, V.24 and V.28 devices.

According to the company, it supports all major protocols with the aid of a protocol and code translator and provides communications among most major word processing systems and personal computers.

The Planet Starter Pack costs \$9,995, according to the vendor spokesman.

Racal-Milgo, 8600 N.W. 41st St., Miami, FL 33166.

TELEPROCESSING PRODUCTS, INC.

TP-314

Teleprocessing Products, Inc. has announced its TP-314 four-channel statistical multiplexer, designed to support asynchronous terminals in synchronous networks.

The TP-314 is said to allow connection of four asynchronous terminals with input speeds from 110 bit/sec to 9,600 bit/sec to a synchronous modem, to one or more ports of a multipoint synchronous modem or to a digital service unit.

The company said a typical use would be providing four 2,400 bit/sec asynchronous data paths over one 2,400 bit/sec modem.

The desktop device costs \$1,350. Teleprocessing Products, Building 7K, 4555 E. Industrial St., Simi Valley, Calif. 93053.

LOCAL-AREA NETWORKS

PROTEON, INC.

Infrared link

Proteon, Inc. has introduced an infrared communications link for use with its local network to interconnect buildings or for use in electronically noisy environments such as a factory or automated warehouse.

Continued on page 94

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The IBM PC market is booming in Australia. By the end of 1984, almost 20,000 units will have been sold. **Australian PC World** — the only computer magazine for IBM PC users in Australia — premiered this March in response to the growing demand. Total distribution has already topped 16,000. And newsstand sales are vigorous from Sydney to Perth.

Forecasters predict that the Australian government and businesses will increase their usage of microcomputers by 170% over the next two years. **Australian Micro Computerworld** is the only monthly magazine covering the market. Written for both single-unit and networked users, most of our 12,000 readers are skilled professionals involved in the selection or design of systems and networks.

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Waltham, MA 02154.



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Honeywell

COMMUNICATIONS

Continued from page 93

The infrared link is intended as an alternative to physical cable connections in Pronet, the company's token-passing local network. The infrared devices reportedly can link Pronet networks together or act as a connecting medium in a single star-shaped ring.

Information can be transmitted at 10M bit/sec for up to 250 meters, depending upon weather conditions. Snow and rain have a minimal disruptive effect, Proton said.

The infrared device reportedly includes a microprocessor that analyzes the link's performance and ensures the integrity of the data transmitted.

A two-unit link is priced at \$17,000.

Proton, 4 Tech Circle, Natick, Mass. 01780.

AUXILIARY EQUIPMENT

PLEX TECHNOLOGIES

Converter

Plex Technologies has announced a serial-to-parallel converter designed to allow computers with RS-232 serial ports to drive Centronics Data Computer Corp.-compatible printers.

The Converter is said to have a standard DB-25S female, 25-pin connector for the serial output and a standard Centronics-type 36-pin ribbon connector for the parallel input.

The transmission rate is user-selectable, with eight rates available from 150 bit/sec to 19.2K bit/sec.

It costs \$90.95, the vendor said. Plex Technologies, 2808 Fourth St., Berkeley, Calif. 94710.

VG SYSTEMS

Remote communications options

VG Systems has announced remote communications options for its VG 8250 color raster and VG 8250 stroke computer-aided design and manufacturing display stations.

The options reportedly enable multiple topologies to be configured, including point-to-point communications, multidrop coaxial lines, a gateway network for remote display stations over a multidrop coaxial network and a multicity, multidrop network over telephone lines. The VG 8250 is being shipped with the multidrop capability.

The gateway option, needed only on the first display station in the network, costs \$3,000.

VG Systems, 21300 Ormond St., Woodland Hills, Calif. 91367.

PHONE from page 87

exchange (PBX) and does facilitate communications, particularly with other Cedars. But at that cost, the user must make do with a non-IBM-style keyboard and be content that he won't need to add a hard disk, which Cedar does not support.

At simpler levels, consider where telephones sit on desks compared with where keyboard devices sit.

Every time Cedar users want to use the device they will have to drag the thing to the middle of their desks.

More practical solution

It would seem that a more practical solution would be to retain telephones — which everybody already has — and update personal computers to get Cedar-like communications functions.

This measure would enable use of full-size personal computers and appeal to a broader market base — the thousands of people who already have personal computers.

Products of this ilk are coming from two sources: PBX vendors and manufacturers of personal computer add-ons.

When Cedar was announced, Rotm also unveiled Juniper, a \$1,360 software and board option for IBM Personal Computers, Personal Computer XT's and compatibles. This device supports most Cedar capabilities — one-touch dialing for voice and data conversations, prestored terminal profiles, VT100 compatibility and 3270 emulation — including the important ability to use the voice and data devices simultaneously.

Less useful than Juniper are the third-party personal computer add-ons. These boards fit in an expansion slot within a personal computer and often do away with the need for a phone.

Instead, a handset — no base — is directly attached to the personal computer from which the "telephone" is dialed or answered. While it provides an electronic telephone, directory and facilitates computer logon procedures, the productivity benefits of these devices are elusive at best.

'Too integrated' problem

Telephone/terminals suffer from the same "too integrated" problem of the Cedar and these personal computer add-ons. These devices are too small — both in screen size and keyboard — to be used as a normal terminal would. But to be fair, that was never the intended use for these devices.

It is possible, however, that the application will someday catch up to technology. Telephones, after all, messaging devices. A telephone/terminal would extend electronic mail to personnel without terminals and make the integration of text and voice messaging systems more desirable and functional. Additionally, such a device could be used to access corporate videotex systems, when and if these systems are ever embraced.

According to industry sources, AT&T will release its own integrated voice/data workstation in January. This device reportedly will have a built-in speakerphone, built-in modem, 3270 emulation and a new touchscreen technology on which an image of a keyboard can be displayed.

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SYSTEMS & PERIPHERALS

Users cool to quality WP units, still prefer multifunction micros

By John Damsch

CW Staff

FRAMINGHAM, Mass. — While dedicated word processors generally offer higher quality output than microcomputers outfitted with word processing software, users seem to prefer multifunction micros for office automation applications. In fact, a market research firm here has significantly altered its market growth predictions for dedicated word processors in light of shipping 1983 sales figures.

International Data Corp. (IDC) predicted that in 1983, the compound annual growth rate in a five-year period for stand-alone word processors would be 27%. But the actual 1983 figures showed only a 10% growth rate.

According to a revision of an earlier report titled "Word Processor Marketplace," IDC stated that since stand-alone micros can perform calculations and run graphics, spreadsheet and other DF software, they appear to have the edge over dedicated word processors in the office. The report defined a stand-alone word processor as a unit sold primarily for office applications with vendor-supplied word processing software. A clustered word processor was defined as one capable of accessing a central processor.

The growth rate of clustered systems was projected to be 38% for the current installed base and 22.7% for new shipments, but the actual rates were 23% for the installed base

and 11% for shipments, the IDC report stated.

Prices for both stand-alone and clustered systems dropped as the industry tried to adjust prices to compete with the microcomputer market. IDC had forecast that stand-alone systems would cost \$10,900 each in 1983 and

drop to \$7,500 by 1987. But according to IDC's revised report, the average price dropped to \$7,720 this year, a decrease of 30% from the previous year. The \$7,500 price is now expected in 1984, three years sooner than originally predicted, IDC said.

On the average, the forecast price for clustered systems was \$10,000. But in 1983, the actual average price turned out to be \$6,950, a 31% reduction, the report stated.

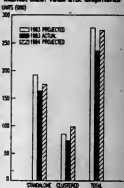
IDC originally predicted the overall shipment value of stand-alone word processors would reach over \$4 billion by 1987. The market research firm now says that overall value will reach only \$1.4 billion by 1986. "This is due to the increased number of personal computers doing

word processing applications, the decreased cost of the word processing systems and the decreasing number of shipments," the report stated.

Manufacturing accounted for most applications, with 22.3% of the stand-alone market and 13% of the clustered market. The government was found to be the second largest.

See IDC page 105

Market Size: Total U.S. Shipments



Word processing shipments in units

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See IDC page 105

NCR unveils Worksaver cluster unit

Control processor links 64 terminals

DAYTON, Ohio — NCR Corp. recently unveiled the Worksaver 3000, a cluster control processor that the company claimed allows up to 64 of the company's Worksaver line of intelligent terminals to share common file storage and applications programs. The unit can also be used as a file server, print server or communications gateway to larger processors.

Based on multiple Intel Corp. 8186 microprocessors, the Worksaver 3000 hardware was developed for NCR by Convergent Technologies, Inc. According to NCR's office systems product manager Tom Davis, the unit uses Convergent Technologies' CTOS operating system and a proprietary local-area network developed by NCR that is based on the RS-422 communications interface. Within this network, all peripherals, files and applications software can be shared among all users, Davis said. The vendor added that security blocks can be used to restrict file access if necessary.

Like other members of the Worksaver line, the Worksaver 3000 employs what NCR calls a Distributed Intelligence Architecture. This, Davis explained, is a concept that allows each workstation attached in a cluster to have individual use of applications software. The advantage of this architecture, Davis contended, is

See NCR page 105

■ Tips for moving computers onto the factory floor/102

■ A shoe manufacturer boosted inventory control with a supermini linked, via satellite, to its South American manufacturing facility/104

■ NCR Corp.'s Microelectronics Division unveiled a 32-bit board-level processor that offers compatibility with Intel Corp.'s Multibus architecture/106

INSIDE

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HARD TALK/TOM HENKEL

IBM, DEC clash to jolt '85 market

IBM and Digital Equipment Corp. have launched a processor performance war that will have a strong influence on almost every large system announced in 1985. In addition, new processors announced by both IBM and DEC have further blurred the already confused distinction between big mainframes and smaller mid-range systems and may signal a significant change in the types of work traditionally performed by mid-range CPUs.

IBM's 4331 Model Group 3 and DEC's VAX 8600 both appear to offer internal performances that challenge the performances of currently available large mainframes.

Some industry watchers seem convinced that IBM's Model Group 3 is a better deal (in a price/performance sense) than the low-end models of IBM's larger 3083 line. When it announced the 8600 in late October, DEC made a point of comparing the performance of its new processor, in a VAX cluster configuration, with IBM's top-of-the-line 2064 mainframe. DEC's move seems to indicate it plans to challenge IBM's thus far impregnable dominance in the mainframe processing arena with a finely

tuned supermini-computer.

The intensifying dual between DEC and IBM is only the beginning of the mid-range systems performance war. Now that DEC and IBM have given power boosts to their systems, other vendors competing in the same marketplace will have to follow suit. Sperry Corp. made its move in early November when it launched the 7000/40, an AT&T Unix-based 32-bit system. In the months to come, look for similar performance enhancements from Data General Corp., Prime Computer, Inc., Wang Laboratories, Inc. and others.

The upshot of all these performance enhancements is a brewing metamorphosis that will change the traditionally held roles of large systems. Supermini-computers appear to be taking over the duties that two years ago were reserved for mainframes. Mainframes seem to be moving into a new performance domain, one that combines traditional computing power with the high-speed number-crunching capabilities formerly found in supercomputers. And multi-million-dollar supercomputers appear to be slowly gaining acceptance as a general busi-

See BATTLE page 105



SHOP TALK
Nash Spencer Room

Data security tactics evolving for terminals

The security requirements for data communications terminals are escalating as managers become more aware of the vulnerability of terminals and the information they can access.

The methods used to compromise data transmitted to or from a terminal have become increasingly sophisticated. As a result, theft, misuse and disclosure problems have, to some degree, been countered by legislative, regulatory and judicial actions. For example, government agencies and several key businesses now require technical and procedural countermeasures for the protection of data. And more organizations now require that data communications equipment have security features before they purchase any.

Historically, there has not been a strong concern for

See SECURITY page 106

Poor to vice-president of advanced technology for Total Assets Protection, Inc., a security consulting and construction firm based in Arlington, Texas.

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

NCR CORP.
Modular Logging System

NCR Corp. has announced the Modular Logging System (MLS) for its 32-bit NCR 9300 CPU, said to be capable of running front- and back-office applications simultaneously on a single processor.

MLS runs property management packages, including registration, rooms management, housekeeping and guest accounting, as well as back-office applications such as payroll, accounts payable, city ledger, travel agent accounting and general ledger. The program runs on NCR's Interactive Transaction Executive operating system.

The price for MLS with a 9300 con-

figuration, including 2M bytes of main memory, 21 communications lines, nine CRTs, 176M bytes of disk storage and printers, is approximately \$125,000, the vendor said.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45478.

SCAN-OPTICS, INC.
ReliReader 536

Scan-Optics, Inc. has announced the ReliReader 536, an optical character recognition system that reportedly offers six output pockets for sorting documents after they have been read. The unit also reportedly allows users to add additional pockets in increments of six, up to a total of 30 per system.

In addition to many printer and typewriter fonts, the Alphanumeric Handprint option enables the system

to read hand-printed material. It has a maximum throughput of 750 document/min.

The price of the ReliReader 536 system will start at approximately \$300,000, and the system will be available in the first quarter of 1985.

Scan-Optics, 22 Prestige Park, E. Hartford, Conn. 06108.

TERMINALS

TELEX COMPUTER PRODUCTS, INC.

Telex 060 and 170 terminals

Telex Computer Products, Inc. has introduced the Telex 060, a 15-in. monochrome terminal, and its 170-color terminal, both said to offer enhanced IBM S270 capabilities.

The two terminals reportedly connect directly to an IBM 3274 controller or Telex 274C control unit. They are said to be available in screen sizes offering 1,920, 2,560 or 3,440 char.

Both are also said to offer extended highlighting, automatic screen cutoff, volume-adjustable audio alarm and a security keylock.

The 060 is priced at \$2,195. The 170 is priced at \$2,295.

Telex Computer Products, 6422 E. 41st St., Tulsa, Okla. 74133.

BOARD-LEVEL DEVICES

EMULEX CORP.
UC08, UC19 host adapters

Emulex Corp. has introduced two host adapters said to provide mass storage control protocol emulation and connect Digital Equipment Corp. Q-bus or Unibus host systems to the small computer systems interface (SCSI).

The UC08 host adapter is a single, quadwide board that embeds in the standard Q-bus backplane slot of the DEC L81-11, Micro/PDP-11 and Microvax. The UC13 is also a single, quadwide board, which plugs into a Unibus slot of the DEC PDP-11 and VAX-11 series computers.

Both the UC08 and UC13 are said to emulate DEC's mass storage control protocol in a manner completely transparent to the operating system software, the vendor said, allowing users to receive all of the mass storage control protocol benefits without the need for patches or operating system modifications.

The UC08 and UC13 allow up to four SCSI drives of any standard type or capacity to be connected to each host, the vendor said. Both adapters are said to support Shugart Corp.'s Optimate 1000, a 1.2G-byte optical disk drive.

The UC08 is priced at \$1,800, and the UC13 costs \$2,200, the vendor said.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

INTERNATIONAL
ELECTRONICS ENTERPRISES,
INC.
MK2

International Electronics Enterprises, Inc. has introduced a printed-circuit board said to check the alignment and operation of hard disk drives.

The MK2 disk mini-exerciser has reportedly been designed to eliminate the need for an oscilloscope when exercising or aligning disk drives. The exerciser can be used to test Control Data Corp. 8762 and 8766; Digital Equipment Corp. RMO2, RMO3 and RMO6; and Wang Laboratories, Inc. 2266 V-1 and 2262 V-2 disk drives.

The MK2 contains logic and switching circuitry said to enable an engineer to perform a complete disk alignment or exercise and check the operation of 40M- to 80M-byte or 160M- to 300M-byte disk drives. The exerciser tests seek direct or between two selected cylinders, random seek, return to zero, head select and alignment circuitry, the vendor said. Test points are provided for read/write, head alignment and ground.

The unit costs \$675.

International Electronics Enterprises, 110 Agate Ave., Newport Beach, Calif. 92662.



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NCR Comten, Inc.

SYSTEMS & PERIPHERALS

AUXILIARY EQUIPMENT

APPLIED CIRCUIT TECHNOLOGY, INC.
Winchester disk drive emulator

Applied Circuit Technology, Inc. has announced a Winchester disk drive emulator said to provide a testing standard for hard disk drives used with personal computers.

Intended for use with both 84-in. and smaller hard disk drives, the emulator is targeted at systems integrators and at disk drive and controller manufacturers for calibrating and verifying read/write capabilities of their units, the company said.

The emulator stores one track of data and accepts and returns up to 10,416 bytes of data during a read/write operation. After a seek test, track zero's data is returned until a write operation is performed.

The price of the emulator is \$1,895, the vendor said.

Applied Circuit Technology, 2591 La Jolla St., Anaheim, Calif. 92806.

PRESTON SCIENTIFIC, INC.
Preston GM/SEL 33

Preston Scientific, Inc. has announced a parallel interface designed to link Preston's 13-bit and 16-bit data conversion systems to Gould, Inc. superminicomputers.

The Preston GM/SEL 33 reportedly provides logic terminations and compatible driver-receiver circuitry for operating Preston's analog and digital conversion subsystems from the Gould/SEL HBS controller. It is available with options for either a 16-bit or 32-bit format, according to Preston.

The 32-bit format is said to provide a data packing feature that allows converted data from Preston's 500-KHz and 1-MHz ADC systems to be assembled in 32-bit words consisting of two 16-bit conversions.

The interface costs \$3,775.
Preston Scientific, 805 E. Corvino Ave., Anaheim, Calif. 92805.

PRACTICAL PERIPHERALS, INC.
DES 2000

Practical Peripherals, Inc. has announced DES 2000 Data Encryption Service, a stand-alone data encryption unit.

The unit reportedly encrypts and decrypts data while using U.S. National Bureau of Standards encryption standards. DES 2000 features local and communication modes of operation, three levels of security and four methods of encryption, the vendor said. The product is said to limit access to an on-line computer and controls entry into specific files on a host computer.

The encryption unit reportedly operates at 10 transmission speeds ranging from 110 to 38,400 bit/sec. DES 2000 Data Encryption Service costs \$450.

Practical Peripherals, 31245 La Brea Drive, Westgate Village, Calif. 91362.

HI-SECURITY CENTRE
Data Armor

Hi-Security Centre has announced the Data Armor data encryption device, developed by Tranco Even, Inc., said to employ two separate encryption systems to safeguard data. Data Armor employs the Data En-

ryption Standard certified by the U.S. Bureau of Standards for nonclassified data encryption. It also employs the Transcrypt data encryption program, said to allow users to select a unique key code for their data using up to a 20-digit number. Transcrypt is said to offer four billion key codes, which the company claims makes unauthorized access impractical.

The device is said to provide phone line dial-up protection by requiring the caller to input the proper identification codes and to protect from unauthorized access by blocking all communications from a terminal that has not been used for five minutes or more.

Data Armor is priced at \$999.
Hi-Security Centre, 3435 Gall Ocken Drive, Fort Lauderdale, Fla., 33308.

PRESTON SCIENTIFIC, INC.
GMAD6A A/D Conversion System

Preston Scientific, Inc. has announced the GMAD6A A/D Conversion System, for analog-to-digital conversion, said to be capable of interfacing a variety of Digital Equipment Corp., Hewlett-Packard Co. and Data General Corp. CPUs.

The GMAD6A is said to have analog conversion accuracy of up to .01% and a 18 msec/channel conversion rate. Features of the GMAD6A include automatic gain control, automatic random channel addressing, automatic repeat-channel addressing and automatic timing control.

A range of analog signal amplifiers and multiplexers can be included within the standard configuration of the GMAD6A A/D, including multi-channel single-ended and differential

multiplexers, fixed-gain amplifiers and filters with accuracy of .005% and sample and hold amplifiers with hold apertures of one msec, according to the company.

Up to 128 single-ended or differential multiplexer channels reportedly can be installed within the 64 in. by 19-in. chassis. The price of a GMAD6A A/D Conversion System with 64 input channels is approximately \$8,500.

Preston Scientific, 805 E. Corvino Ave., Anaheim, Calif. 92805.

KEYWORD OFFICE TECHNOLOGIES, INC.
Keyword 7000

Keyword Office Technologies, Inc. has introduced its Keyword 7000 disk-to-disk data conversion device.

Continued on page 100

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SYSTEMS & PERIPHERALS

Continued from page 98

Keyword 7000 reportedly allows diskettes created on one word processor to be used on other word processors or personal computers. The Keyword 7000 can interface with Wang Laboratories, Inc.'s WPS, OS/2 and VS product line; Xerox Corp.'s 820; the IBM Displaywriter; Lanier Business Products, Inc.'s No Problem and Super No Problem; Phillips Information Systems, Inc. Microm 3000 and 3000 series; and Digital Equipment Corp.'s Decmate II.

Additionally, users only need to buy one hardware box plus software pairings that convert incompatible diskettes, the firm said.

Keyword 7000 hardware is priced at \$9,995, including one software pairing. Additional software pairings are priced at \$495 each.

Keyword Office Technologies, 3047 Hamilton Ave., San Jose, Calif. 95125.

DIGITAL PRODUCTS, INC. Digital Datacollector

Digital Products, Inc. has announced Digital Datacollector, a bi-directional network/buffer said to provide a link between process control, shop or laboratory equipment and a central management analysis computer.

According to the company, the Digital Datacollector features up to eight hours of data collection buffering and the ability to download programs and instructions via user-definable commands.

The device is user-transparent and said to be capable of networking up to 16 different devices. It consists of modular, expandable RS-232C-compatible components, including all cabling, software and instruction manuals, the company said.

The price of the Datacollector ranges from \$595 to \$8,000, depending on configuration, the company said.

Digital Products, 600 Pleasant St., Watertown, Mass. 02172.

BAHER, INC. Multidisk Reader Model 3261

Baehr, Inc. has announced the Multidisk Reader Model 3261, said to be capable of accepting files from Digital Equipment Corp.'s Decmate II and Rainbow microcomputers as well as Lanier Business Products, Inc.'s Multiplex word processor.

The Model 3261 is said to transmit data directly to a typesetter, word processor or CPU without rekeying, modems or conversion services. The product reportedly can read single-, double- and quad-density, 5¼-in. and 8-in. floppy disks. Existing 8161 models can be upgraded, according to the company.

The price of the Model 3261 is approximately \$7,495, the company said.

Baehr, 3 Northern Blvd., Amherst, N.H. 03001.



"Hi there, handsome!"

DOLCH LOGIC INSTRUMENTS, INC. Palas 40C30

Dolch Logic Instruments, Inc. has announced its Personal Advanced Logic Analysis System, Palas 40C30, a stand-alone instrument for testing microprocessors.

The instrument has RS-232 and General Purpose Interface Bus compatibility.

Palas 40C30 features include three setup menus for recording, triggering and compare; a 9-in. CRT display; nonvolatile setup memory; up to 40 channels — 32 data and eight trigger qualifiers; support of eight- and 16-bit microprocessors; and dual-time base clocking, according to the company.

Price of the Palas 40C30 is \$3,900, the company said.

Dolch Logic Instruments, 2029 O'Toole Ave., San Jose, Calif. 95131.

COMPUTYNE, INC. Sensaphone 1000C/X

Computyne, Inc. has introduced a computer room security monitoring device said to feature automatic voice call-out and inquiry response capability.

Sensaphone 1000C/X is said to have the capability of monitoring and reporting by telephone on environmental and electrical conditions in a computer room or secure area. The basic system monitors temperature, power status, sound level and the status of its own battery backup.

An alarm condition exists in the following circumstances: when the temperature falls outside high and low limits set by the user, when the

electrical power falls for more than five minutes, when there is a sharp change in the sound level near the unit for more than 10 seconds and when the backup batteries in the unit are near exhaustion, the vendor said. The price for Sensaphone 1000C/X is \$300.

Computyne, 10 Deangelo Drive, Bedford, Mass. 01730.

APPLIED CIRCUIT TECHNOLOGY, INC. Portable Test Station

Applied Circuit Technology, Inc. has announced a portable computer disk drive test device said to be designed for single-unit testing.

The desktop Portable Test Station (PTS) tests Winchester disk drives of both 5¼-in. and sub-5¼-in. the vendor said. Features reportedly include

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\$234.



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SYSTEMS & PERIPHERALS

two forms of test criteria: the standard, with pass/fail limits set by the disk drive manufacturer; or the conditional, with additional user-set parameters. The PTS is said to read media flaw maps that are written on disks at their manufacturing site.

The PTS, reportedly designed primarily for disk drive repair, rework and development and receiving inspection, is comprised of disk drive certification electronics with power supplies, a CRT screen, keyboard and 5¼-in. half-height floppy disk.

PTS is priced at approximately \$8,000.

Applied Circuit Technology, 2631 LaJolla St., Anaheim, Calif. 92806.

DIRECT, INC. PC8624B

Direct, Inc. has announced an in-

terface package said to allow IBM Personal Computers to communicate with Hewlett-Packard Co. HP 3000 host computers.

According to the vendor, the PC8624B display enhancement card and diskette software provides 80-by-132-col. screen format and 27 text lines for a full 34 lines of text with two rows of function key soft labels and a file send and receive module.

The product is priced at \$695, the vendor said.

Direct, 4201 Burton Drive, Santa Clara, Calif. 95054.

VOYAGER DEVELOPMENT, INC. Model SP101 antipiracy device

Voyager Development, Inc. has added an antipiracy device to its Voyager SP100 series intended for

use by software developers. The Model SP101 places part or all of the protected programs in molded plug-in read-only memory (ROM) modules.

The microprocessor-based SP101 has provisions for four plug-in modules, each containing from 2K bytes to 64K bytes of user code, providing a maximum of 256K bytes of available, on-line ROM at any one time, the vendor said. Each module reportedly can protect one or more programs, or the entire 256K bytes can be used for one program.

The SP101 device connects to standard RS-232C ports and was designed so that data reportedly passes through the device output port in a transparent mode when not transmitting.

The device contains automatic transmission rate determination and will function at rates from 50 to

19.2K bit/sec, according to the vendor.

Prices start at \$32.50 for the base SP101 device and vary with order quantity. Plug-in modules start at \$5.50 for 2K bytes of ROM and vary with capacity and quantity, the vendor said.

Voyager Development, 412 S. Ligon St., Santa Ana, Calif. 92701.

REMOTE MEASUREMENT SYSTEMS, INC.

ADC-1 Data Acquisition and Control System

Remote Measurement Systems, Inc. has introduced the ADC-1 Data Acquisition and Control System that can be used with any personal computer with an RS-232C interface.

As an analog/digital input interface, the ADC-1 lets nearly any computer talk with sensors and instruments of all kinds.

As a computer control system, it makes six digital controlled outputs and RS8 U.S.A., Ltd.'s X-10 system of line-carrier wireless remote control available to the programmer.

Price of the unit is \$395. Available options include sensors, cables, control modules and software diskettes at a variety of prices.

Remote Measurement Systems, P.O. Box 15544, Seattle, Wash. 98115.



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SYSTEMS & PERIPHERALS

Flexibility required for automated factories

By John C. Rowe
Special to C&E

The automated factory requires combining production, processing and material-handling equipment into a single computer-controlled system. The efforts toward this integration started with decentralized numerical-control automation of simple machine tools and metal-forming equipment. As this automation trend evolved, it employed the computer and computer-based communications to support integration.

This was accomplished horizontally to incorporate more functions and vertically to bring more and more devices into coordinated control of the

work flow on the floor.

The integrated factory exhibits flexibility—the ability to establish new factorywide machine setup; the ability to implement engineering changes in a controlled, coherent manner; and the ability to react to changes occurring on the factory floor in a real-time mode.

Computers used at all levels

This flexibility and control exist because of the use of computers at all levels of the industrial organization. A variety of computers is used to control the production factory. They include mainframes, superminicomputers, minicomputers, microcom-

puters and programmable logic controllers. As the fully integrated factory continues to develop and evolve, each of these types of computers will play its own role. There is not one single best solution to control the factory.

It is not practical to tie every sensor and device into a single host mainframe due to the time-critical nature of many control processes. Conversely, a completely distributed arrangement of all of the production devices with communications and coordination attempted among all of them in a peer-to-peer mode would be chaotic.

In order to understand the levels

of control required in the factory, it is necessary to classify the factory into a hierarchy of manufacturing and then describe the role that computer control plays in each of the levels.

Factory segments

The U.S. Air Force Integrated Computer-Aided Manufacturing Program has constructed a model of the manufacturing process that segments the factory as follows:

■ **Process** — A single operation or set of operations carried out by a person or machine, not aided by an external hierarchy of program-driven circuitry or software. Processes are primarily controlled by a station controller or person.

■ **Station** — The lowest level of automated control. It is composed of sets of processes under the control of software resident at or under the direction of the station. Stations control processes but do not control other stations.

■ **Cell** — A basic concept in plant operation, controls stations and any process that is external to station control. Cell controllers control multiple stations or a single station if it is accompanied by at least one process not under station control.

■ **Center** — The grouping and control of two or more cells. A center may control a single station that is external and not controlled by a particular cell.

■ **Factory** — The grouping and control of one or more centers. Single cells not under the control of a center may be under the control of the factory controller. The factory is that level in the hierarchy that is controlled by management personnel and business policies.

Each of the various types of computers available on the market today has a place in factory automation. System cost vs. performance under the communications and control load of a moderately large number of distributed attachments is the major consideration.

When considering the power, response and flexibility of the computers available, minicomputers are ideal for the intermediate levels. In fact, their attributes make them a viable choice for filling the task at both the cell and the center levels, which are the key intermediate layers of factory control. They are much less expensive than large mainframes or superminicomputers. They also offer more operating system and communications flexibility than microcomputers. They offer relatively easy upgrades to increase processing power by substituting or adding circuit boards, as well as large potential additions to on-line file storage.

A major advantage that minicomputers have within the factory environment is their extensive communications capability. Distributed processing control as described also requires a hierarchy of communications along with the hierarchy of computer control.

Rowe is a principal of J.C. Rowe & Associates in Cleveland, a consulting firm specializing in factory automation and computer-aided manufacturing.



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*National Institutes For Occupational Safety and Health Study, August 1981.

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SYSTEMS & PERIPHERALS

System fits shoemaker's market data needs

STAMFORD, Conn. — A shoe manufacturer here claims it has improved its ability to compete in the rapidly changing consumer goods marketplace by installing a super-microcomputer with a satellite link to the firm's manufacturing facility in Brazil.

In just six years, Fisher Camuto Corp., a manufacturer and marketer of women's shoes, has become one of the largest privately owned shoe companies in the U.S.

Last year, the company produced more than 15 million pairs of shoes at its manufacturing facilities in Brazil. The company supplies more than 5,000 retailers, and the company is establishing a retail chain that it hopes will expand to more than 200 stores in the next two years.

Faced number of challenges

Until 1983, Fisher Camuto was strictly a wholesaler. When management elected to create an organization for direct sales to customers, it had to face a number of challenges.

First, the company had to find a way to get the maximum competitive advantage from its vertical integration. To do this, it needed to transfer information from its retail outlets to corporate headquarters and then to the manufacturing plants in Brazil. This process would allow management to respond on a daily basis to shifts in the marketplace, stepping up production of hot sellers and reacting to inventory needs relative to reorder and markdown, noted Ken Scharf, the company's vice-president and director of MIS.

A second concern was how to evaluate the wide range of variables involved in tracking and identifying inventory. This problem was particularly acute for Fisher Camuto because, Scharf said, the company offers a large number of colors.

A third concern was speed. Fisher Camuto wanted to move fast, but Scharf said that developing custom software to perform all the desired functions would take at least a year. That was longer than Fisher Camuto wanted to wait.

It was at that time that Fisher Camuto first learned of MDS Qantel Corp. The company elected to purchase a Qantel System 64 supermini with 512K bytes of main memory, MDS Qantel's Frame III software, a 600-line/min printer, and 12 terminals. The system also includes 26 IBM 3884 cash registers that record point-of-sale information at stores. An IBM 4381 mainframe located at company headquarters here polls these registers nightly, Scharf said.

Scharf said the company also uses the system for inventory, sales forecasting and marketing analysis. It has also added packages for accounts payable and general ledger to oversee

A satellite link helps Fisher Camuto track merchandise on a daily basis, allowing it to respond to shifts in buying trends in time to reorder popular styles within the same season.

the administrative aspects of its stores.

A satellite link between Fisher Camuto headquarters and its manufacturing facilities in Brazil allows plant managers in Brazil to know what types of shoes are selling each day in

the U.S. and allows headquarters managers to verify inventory levels in Brazil, Scharf said.

Fisher Camuto is able to track merchandise on a daily basis, determining what is selling and what is not. Thus, Scharf said, allows the

company to respond to shifts in buying trends in time to reorder popular styles from its manufacturing plants within the same season. If a certain color is hot, Scharf said, Camuto can respond by offering that color in a variety of styles. Conversely, Scharf said, the firm can pinpoint quickly and mark down slow movers to increase cash flow.

The Qantel system also gives Fisher Camuto the ability to test-market new products before putting them into full-scale production. Sales can be monitored from company headquarters, and full-scale production can be ordered if the product tests well.

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SYSTEMS & PERIPHERALS

NCR adds 32-bit board-level processor

COLORADO SPRINGS, Colo. — NCR Corp.'s microelectronics Division announced a very large-scale integrated (VLSI) 32-bit board-level processor said to be compatible with Intel Corp.'s i860 architecture.

Called the NCR/86300, the unit features three members of the firm's NCR-82 chip set, including its microprogrammable Control Processor Chip, an Address Translation Chip and an Extended Arithmetic Chip. Internal microprogrammability is supported with 16K words of random-access memory microcode instruction storage. There is also a 128-word scratch pad memory for temporary data storage, the vendor said.

Operating with a 32.5-MHz clock, the board has instruction and bus access speeds of 150 nsec. The addressable memory capacity is 4G bytes of virtual storage and 16M bytes of real memory, the vendor said.

Applications for the board include dedicated algorithm processing, graphics representing, robotics control, and signal language interpretation and virtual machine emulation. The board was designed for users with computer-aided applications. The board can be added to S- and 18-Mbit Multibus computer systems, the vendor said.

The board costs \$4,800; a suite of NCR-developed software tools that provide a design monitor, installation and trap/interrupt service routines costs \$800. The board will be available this month, according to the vendor.

More information on the products is available from the vendor's VLSI Product Marketing Division, which is located at 1635 Acropolis Drive, Colorado Springs, Colo. 80905.

NCR from page 97

that it eliminates CPU contention and performance degradation problems that can occur with systems that rely on a single CPU to manage all applications software.

The Worksafer 3000 can operate with any product in the company's Worksafer line. These include the Worksafer 100, 200 and 300 series of workstations. Previously, only the Worksafer 300 could be used as a cluster controller. Davis added that the Worksafer 300 was only capable of supporting a cluster of three workstations.

Davis said the Worksafer 3000 can also be used as a communications gateway to larger systems. By using an NCR software product called the Workstation Host Access Method, users can access NCR mainframes running the firm's VEX operating system. The unit can also be used to provide asynchronous, binary synchronous or IBM 3270 terminal emulation. The unit can also be used for remote job entry to an IBM host, or it can be used in an IBM Systems Network Architecture network environment.

The Worksafer 3000 can accommodate up to eight processor modules and can support up to six 300M-byte disk drives.

A standard configuration of the Worksafer 3000, capable of supporting up to 16 workstations, costs \$48,500. That configuration includes system software, a 5M-byte removable cartridge disk drive, two 50M-byte disk drives, a file processor, a cluster processor, two memory expansion boards, one parallel port and three serial ports.

Volume shipments are scheduled to begin in the second quarter of 1985, the vendor said, from NCR World Headquarters, Dayton, Ohio 45470.

IDC from page 97

est market, with 15% of the stand-alone market and 18% of the clustered market.

IDC predicted that word processors will continue to increase market penetration in paper-intensive areas such as government, legal and insurance industries, for secretaries and clerical workers. But because of the influx of multifunction systems and because of the tendency toward personal computers with third-party word processing packages over multifunctional word processors, IDC is not predicting significant increases in sales in the professional or managerial marketplace.

IDC estimated that 80% of total word processor sales in 1983 were made directly, 9% through office product dealers, 4% through distributors and 3% each through dealers and OEMs.

In market share, IBM continued to dominate the stand-alone market with 29.8% of shipments and 39.5% of the installed base. Digital Equipment Corp.'s multifunctional Decmate systems showed a 168% increase in shipments and 141% increase in installed base.

The clustered market continued to be dominated by Wang Laboratories, Inc., with 49% of shipments and 50.8% of the installed base.

The report is available for \$1,000 from IDC, Five Speen St., Framingham, Mass. 01701.



GOULD

SYSTEMS & PERIPHERALS

SECURITY

from page 97

terminal security. Most early terminals were designed with the assumption that security, if any, would be provided through either the physical security of the facility or through logical security designed into the host computer system.

Most early terminals were dumb and incapable of storing significant amounts of data. Consequently, there were higher security risks associated with paper tape or printouts than terminals. Also, older terminals were directly connected to the host computer, primarily through dedicated circuits, which also limited risks.

Today, however, technology has eclipsed the historic terminal environment. Intelligent terminals can have significant storage capabilities

Misuse of a terminal can occur when an unauthorized person uses a terminal or when an authorized person uses a terminal in an unauthorized manner. Such misuse threatens both the integrity and the privacy of data stored at the terminal and can sometimes compromise the actual operation of the terminal.

that make them removable data bases that must be protected.

It is often difficult to secure terminals because they are placed in warehouse, office or manufacturing locations that lack the physical security routinely provided by a computer center. The portability, high-dollar value per pound and widespread use of microcomputers have created a

black market for terminals, microcomputers and components.

Misuse of a terminal can occur when an unauthorized person uses a terminal or when an authorized person uses a terminal in an unauthorized manner. Such misuse threatens both the integrity and the privacy of data stored at the terminal and can sometimes compromise the actual op-

eration of the terminal.

It is also possible for someone to penetrate the logical security of the host computer through a terminal. Dependent upon a terminal's storage or processing capabilities, a perpetrator can use it to trap data sent to the host computer. Security breaches of this sort compromise the identification and authentication processes, such as a login identification and password used on the host computer system.

Some terminals — those integrated with a telephone — store the telephone number and access codes for automatic login to host systems. If this feature is misused, the number and codes can be altered, destroying the security of the associated host systems. These examples demonstrate that if terminals can be misused, host systems can be as well. Such misuse opens the door to fraud, malicious mischief and denial of service. The potential losses in productivity and asset conversion easily exceed the value of the terminal equipment.

Another serious information threat — disclosure — is a risk to valuable data and proprietary software. Actual access to the victimized terminal is not essential here. Most networks are vulnerable to disclosure regardless of whether they use coaxial cable, microwave terrestrial links, satellites, switched or dedicated circuits.

Although exploiting the electromagnetic interference (EMI) or electromagnetic conductance (EMC) transmission of data from terminals requires specialized equipment that remains relatively expensive, there are buyers for such hardware. Today, 96% of all terminals emanate characteristic EMI/EMC patterns from their keyboards, CRTs, printer elements, storage devices and other electronic and electromechanical components that can be recorded, analyzed and traced back to the original characters. Thus, messages entered or displayed at the terminal can be re-created for eavesdroppers.

To counter these security threats, managers must implement both technical and human procedural controls. Products like the Anchor Pad by Anchor Pad International, Inc. can prevent theft of terminals. The misuse of terminals can be reduced by requiring a means for identifying authorized users and by limiting the functions or data accessible to authorized users.

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BYTE Magazine's Sieve Benchmark



In a comparison of Sieve-Benchmark COBOL 1.6A, Micro Focus COBOL 2.4 and PHILON FASTCIBOL 1.0 using the BYTE Magazine sieve benchmark the results are conclusive: PHILON FASTCIBOL outpaces the competition 47 times faster than Micro Focus and 47 times faster than IBMCOBOL (system configuration, hardware/standard time base).

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BATTLE

from page 97

new tool.

The top two vendors of IBM-compatible mainframes, for example, both have announced plans to market Japanese-developed supercomputers as part of their regular processor lineup.

Industry watchers add they feel certain that IBM's rumored Sierra mainframe, while it may not offer supercomputer-class capabilities, will possess impressive number-crunching capabilities that far exceed those of currently available IBM mainframes.

Unlike supercomputers, mainframes with impressive number-crunching capabilities appear geared to perform traditional file-oriented functions and the sophisticated modeling and simulation tasks that many users are now demanding.

MICROCOMPUTERS

Visage ties micros, videodisk players

Development tools offered for visual information systems

BOSTON — Visage, Inc. has announced a line of visual information system products here that combine an IBM Personal Computer or compatible system with an interactive videodisk player for training, computer-based instruction, visual archiving and other applications.

In addition to what the firm hailed as "the industry's first IBM Personal Computer-compatible interactive video systems" and a host of software tools said to provide authors with a complete development environment, Visage introduced plug-in boards, interactive video upgrade kits and other options.

Visage's V-Station 2000 series includes five models, each featuring an IBM-compatible micro with videodisk player controller board, 13-in. red-green-blue (RGB) monitor and software development and runtime tools. Common system features reportedly include the ability to run most videodisk players, to overlay computer-generated graphics on the video image and to read digital data encoded on the video signal.

The V-Station series ranges from the VIS-2001 delivery system, with 256K bytes of random-access memory (RAM) and dual floppy disk drives, to the VIS-2005 development system, with 512K bytes of

See VISAGE page 126

Minis to act as hosts

Larger role predicted as departmental CPU

By Edward Warner

WALTHAM, Mass. — The minicomputer, not the mainframe, is destined to become the host processor of choice for departmental personal computer networks in Fortune 1,000 firms, according to analyst George Colony, president of Forrester Research.

Colony, who spoke at the future of corporate computing at the Boston regional meeting of the Microcomputer Manager's Association here last month, said he expects minicomputers, serving as what he called departmental resource processors, to become the standard in Fortune 1,000 firms. The processors, he explained, will control a local data base and a local network of what are likely to be mostly IBM Personal Computer ATs.

The departmental resource processor will reduce the need for micro-to-mainframe communications by housing the department's or division's data base. As presently he said, Fortune 1,000 firms, most with as many as 80 to 70 different divisional loca-

tions, experience large data communications costs when they try to link all their sites with a central mainframe.

"Intersite communications costs are going to force these [data processing] functions to be pushed out to the departmental level," he observed.

For both the corporate personal computer manager and the data processing manager, however, the resource processor will mean a loss of power, Colony said. The departmental resource processor is likely, he estimated, to be put in the hands of an on-site administrator who knows minicomputers and data communications, someone who once was "the minicomputer renegade of the 1970s."

Moves toward the departmental resource processor can already be seen in the rise of multiuser personal computers such as the Personal Computer AT and in the spread of such multifunction software as Data General Corp.'s CEO and Digital Equipment Corp.'s All-in-One, noted Colonel Corp.'s All-in-One, noted Colonel Corp.'s All-in-One.

See MINIS page 126

■ Control Data Corp. announces Process Flow Analysis software/100

■ Sysgen, Inc. launches a 45M-byte cartridge tape backup system for the IBM Personal Computer line/100

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Innovative developers aim at Apple Macintosh



SMALL TALK
(Plus Kornetwoks)

You are a software developer. You are young, energetic and bright, and you would like to become a millionaire.

You have written a data base management system (DBMS), spreadsheet or telecommunications package that someone else marketed. You were disappointed with the way the package was marketed and vowed to do it yourself the second time.

This morning, while pouring milk over a bowl of your favorite cereal, you had an idea for a new product — a product no one else is making, everyone needs and one that could make you a millionaire.

Decisions must be made, and one key choice is what machine should run your software.

One year ago, you probably would have chosen the IBM Personal Computer. Today, you're more likely to turn to Apple Computer, Inc.'s Macintosh.

"At [Comdex/Fall '84], there was a lot of software for the Macintosh," noted Robert Lefkowitz, director of microcomputer system software research at Info-

corp, a Cupertino, Calif., market research firm. "If the manufacturers can get the products to market in good shape, there will be some real interesting Macintosh products in 1985."

If 1985 mirrors 1984, it will bring few interesting products for the IBM Personal Computer. This year, bells and whistles were added to Personal Computer, spreadsheets, data bases, word processors and communications packages. But, while more bells in a spreadsheet, additional records in a data base or automatic dialing capabilities in a communications package may aid a user, they are not very enthralling.

See MAC page 128

Perkin-Elmer's Unix-based micro to support five users

OCEANPORT, N.J. — Perkin-Elmer Corp. today is scheduled to announce an AT&T Unix-based, 32-bit supermicrocomputer.

The PE 7350A, built around an 8-MHz Motorola, Inc. 68000 microprocessor and supporting up to five users, is targeted to applications such as wholesale distribution systems, graphics and computer-aided design, disbursement systems, Unix training and application development and small business accounting and control.

According to the company, the product is now available to OEMs, value-added resellers and large user companies. A spokesman said the product is not designed to replace the year-old PE 7350 supermicro, but that it is smaller and offers a better price/performance ratio.

The PE 7350A, with an entry-level system price of \$8,250 in single quantity and \$5,100 in quantities of 100, is said to be Ethernet-ready, with expansion space for a PE Ethernet Data Link Controller board, also announced today (See story

page 87). That controller is said to give the 7350A access to a PE Ethernet local-area network and the resulting gateway to X.25 packet-switching and IBM Systems Network Architecture/Synchronous Data Link Control networks.

Supports Unix System III

The PE 7350A features the Unisoft Corp. Unix port of AT&T Unix System III. The system is said to support up to five users by connection of PE terminals to four RS-232C ports. An IEEE 488 bus is optional. The processor consists of the Motorola 68000, a 24-bit memory address bus and a 16-bit data bus and is said to have a 150 nsec random-access memory (RAM) access time and a 500 nsec RAM cycle time.

It features a minimum memory of 512K bytes and a maximum memory of 3M bytes and is available with a 380K-byte floppy disk and a 15M-byte or 30M-byte, 5¼-in. Winchester disk drive. The system is available with four monitors, including a

13-in. color graphics monitor with a palette of 27 colors.

In addition to Unisoft, the 7350A includes an interface for PE's OS/32 operating system and the PE Menu Maker user interface. The system reportedly supports Fortran 77, C, Unisoft's Basic-Plus, Ryan-McFarland Corp.'s RM-Cobol and Software Ireland Ltd.'s Sibol.

Third-party software now available is said to include Mark-of-the-Unicorn, Inc. Finalword, VisiCorp Visi Word, Access Technology, Inc.'s Supercomp-Twenty spreadsheet and Unify Corp.'s Unity relational data base.

An entry-level system, including 512K bytes of memory, four ports, 15M bytes of hard disk storage and the operating system, costs \$8,250.

A multiuser system with 1M byte of memory, four ports, 28M bytes of hard disk storage and the operating system costs \$10,900, the vendor said.

More information is available from PE, which is located at 2 Crescent Place, Oceanport, N.J. 07757.

MICROCOMPUTERS

CDC software for IBM micro automates process-flow analysis

MINNEAPOLIS — Control Data Corp. has introduced Process Flow Analysis (PFA) Micro software. The software is said to allow businesses to automate process-flow analysis, a management technique that uses flow charts to examine repetitive operations.

PFA Micro, for the IBM Personal Computer, reportedly can cut documentation time by 50% over manual systems.

The software is also able to generate automatically nine different reports to identify areas where processes can be improved, according to the vendor.

PFA Micro is said to be supported by consulting services from Control Data Business Advisors, a CDC subsidiary, and by training modules. The training modules are said to be provided either on diskette or via workshops by using a facilitator's kit from CDC.

The PFA Micro software is priced at \$950.

The training modules are priced at \$450 for diskettes and \$950 for the facilitator's kit, which is said to include slides, videotape and a facilitator's manual.

CDC is located at 3601 W. 77th St., Minneapolis, Minn. 55435.

Metasoft package integrates word processing, graphics

CHANDLER, Ariz. — Metasoft Corp. has introduced a software package that integrates word processing with presentation graphics for personal computers from IBM and other manufacturers.

The Benchmark Composer reportedly provides word processing that features word wrap, on-screen display of page breaks and automatic pagination. Its built-in graphics offer both business and presentation functions and can be windowed into a word processing document, according to the vendor.

The program's graphics capabilities are said to include the capacity

to produce line, bar and pie charts as well as x/y plots. The graphics facility is able to interface with either a mouse or a graphics tablet and permit users to zoom or rotate images, Metasoft said.

The Benchmark Composer is priced at \$675 and available for the IBM Personal Computer, 3270 Personal Computer and 3270/Q Personal Computer. It is also available for the Texas Instruments, Inc. Professional and the Digital Equipment Corp. Rainbow 100 microcomputers.

Metasoft is located at Suite 12, 6559 W. Frye Road, Chandler, Ariz. 85224.

Package allows micros access to ITT's Telex

SECAUCUS, N.J. — ITT Communications Services, Inc., a division of ITT, said it has signed a joint marketing agreement with American International Communications Corp. of Boulder, Colo., for a software package said to allow personal computers to be used as Telex terminals.

The DCS-300 software program, developed by American International, provides access to ITT services through personal computers with communications capabilities. The package is said to support ITT's interactive Telex and directory services and includes a message editor to permit off-line message creation.

The package runs on the IBM Personal Computer and the ITT Xira and compatibles, ITT said. It costs \$250. ITT is located at 100 Plaza Drive, Secaucus, N.J. 07096.

Sysgen offers micro backup

FREMONT, Calif. — A 45M-byte cartridge tape backup subsystem for the IBM Personal Computer, Personal Computer XT and Personal Computer AT was among several products recently announced by Sysgen, Inc.

The Qic-File is a half-height, medium-size subsystem that is said to back up from one disk and restore to another. The product sells for \$1,395 for an internal version and \$1,495 for an external model.

Sysgen also announced a Winchester disk/streaming-tape backup subsystem for the Personal Computer, Personal Computer XT and AT. The Sysgen XL reportedly gives users a 90M-byte half-height streaming-tape backup drive plus a 20M-byte formatted half-height hard disk. Cost of the Sysgen XL is \$3,295.

A six-slot expansion box for the IBM Personal Computer and Personal Computer XT was also announced by Sysgen. It sells for \$1,995.

Sysgen is located at 47863 Warm Springs Blvd., Fremont, Calif. 94539.

PICK ONE.


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MICROCOMPUTERS

Seequa Computer introduces Cobra micro, upgrades portables

ODENTON, Md. — Seequa Computer Corp. recently introduced a personal computer that runs Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M 80 operating systems. The company also announced enhancements to its Chameleon Plus and Color Chameleon portables.

According to the company, Cobra features an Intel Corp. 8086 microprocessor, hard disk, color graphics capabilities and six IBM Personal Computer-compatible expansion slots. Standard features include a Zilog, Inc. 280A processor for 8-bit, CP/M 80 compatibility; an 83-key keyboard; one double-density, double-

aided floppy disk drive; 256K bytes of random-access memory (RAM) expandable to 640K bytes; and 16K bytes of read-only memory (ROM).

Cobra sells for \$4,996.

The Chameleon Plus portable computer is said to include three built-in IBM-compatible expansion slots, 8086 and 280A dual processors, 128K bytes of RAM and 16K bytes of ROM. The product sells for \$1,895.

Three IBM-compatible expansion slots also reportedly have been added to the company's Color Chameleon computer, priced at \$3,196.

Seequa is located at 5906 Telegraph Road, Odenton, Md. 21113.

SOFTWARE

MANAGEMENT SCIENCE AMERICA, INC. The Tool Kit

Management Science America, Inc. has announced a two-disk set of utilities that are said to enhance the productivity of Peachtree Software, Inc.'s Peachtree 5000 software.

The Tool Kit is said to include add-ons designed to enhance Peachtree 5000's components, including Peachtree word processor, Random House Electronic Thesaurus, Spelling Proofreader, List Manager and Peachtree electronic spreadsheet.

The Tool Kit is said to include full support of color monitors, expanded printer support, document formatting templates for Peachtree that can

be selected by the user from a menu and used to create original documents quickly and expanded dictionary coverage for Spelling Proofreader. Also included are a new List Manager utility and templates for List Manager and Peachtree.

Peachtree 5000 runs on the Columbia Data Products, Inc. MPC, Compaq Computer Corp. Portable Computer, Corona Data Systems Personal Computer and Portable Personal Computer, IBM Personal Computer and Personal Computer XT, Eagle Computer, Inc. 1600 and Personal Computer, Texas Instruments, Inc. Professional Computer and the Zenith Data Systems Corp. 2100.

The Tool Kit, priced at \$10, comes on two 320K-byte diskettes.

Management Science America, 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

PROJECT SOFTWARE & DEVELOPMENT, INC. Qwiknet Version 2.0

Project Software & Development, Inc. (PSDI) has announced Version 2.0 of its Qwiknet project management software for Microsoft Corp.'s MS-DOS 2.0 operating system.

According to a spokesman, Qwiknet can manage up to 250 activities on a micro and enable a user to plan the time, money and resources necessary to complete a project. The enhanced version features added functions and documentation to improve the efficiency of planning, scheduling and analyzing cost and resource disbursements.

Version 2.0 is said to permit users to create resource histograms and generate reports from a selection of 50 standard formats. A logic diagram can be printed to show the entire project's activities and their interdependencies.

The software's tabular reporting output has been supplemented with resource and cost histograms, and users can perform project cash-flow analyses, the vendor said.

Version 2.0 of Qwiknet requires a minimum of 384K bytes of memory and two floppy disk drives or a floppy and hard disk drive combination. It is priced at \$895, including a mouse interface.

PSDI, 14 Story St., Cambridge, Mass. 02138.

WARNER SOFTWARE, INC. Desk Organizer for MS-DOS

Warner Software, Inc. has introduced a version of the Desk Organizer software package designed to run under Microsoft Corp.'s MS-DOS operating system.

The latest version of the Desk Organizer will run on the IBM Personal Computer, Personal Computer XT, Personal Computer AT and PCjr as well as compatible systems, the vendor said.

The Desk Organizer is said to be an integrated program that features a number of efficiency tools. Capabilities include filing, phone dialing, calculation, data transfer and word processing, the vendor said.

When run concurrently with another software program in the MS-DOS version, the Desk Organizer's random-access memory demand is reduced to 85K bytes.

The program is priced at \$195. Warner Software, 666 Fifth Ave., New York, N.Y. 10103.

See TABLE page 112

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From the moment you take a 5300 out of the box and plug it into your system, you'll be amazed at how easy it is to operate. To begin with, you can down-line load or simply push a button on the printer's control panel to set options. And just push another button to select an alternate option set for a different system. A 4-character LCD on the control panel provides all of the status indicators you need.

The 5300 is available with a built-in 300/1200 baud modem that saves desk space and makes it possible for the 5300 to do all dialing and logon functions. So you can access a CPU or timesharing network by simply depressing a key on the detached keyboard.

For printing versatility, the 5300 is hard to beat. It features graphics capabilities as well as emphasized, expanded and compressed printing. And when used as an auxiliary printer, the 5300 is well-suited for use with most ANSI display-based terminals such as the Teletype® 5410 and 5420.

You'll also appreciate the forms handling of the 5300. It is available with adjustable push or pull tractors; a roll paper holder, a supply rack and an accumulator.

Other features that make the 5300 an even better value include an interchangeable platen, acoustic adapter and a carrying case for the 9½" model.

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MICROCOMPUTERS

TOOLS from page 109

CWAY SOFTWARE, INC.
Cway People, Cway Strategy

Two application packages designed to aid managers with employee appraisals and plan company growth have been introduced by Cway Software, Inc.

Cway People and Cway Strategy run under the IBM PC-DOS and Microsoft Corp. Xenix operating systems and feature menu-driven commands with on-screen instructions, the company said.

Cway People maintains applicant, employee and job files. The product includes an interviewing function that prompts questions about verbal communication, interpersonal skills, job history, education and career

goals. Answers are coded and tallied numerically. Other functions focus on screening candidates, employee appraisals and report generation, Cway said.

Cway Strategy reportedly guides the user through building a business definition and solidifying long-term goals. Customer purchase and business environment considerations are used to develop short-term objectives and profit projections.

Each package costs \$399 for the PC-DOS version and \$499 for Xenix. Cway Software, 121 W. DeKalb Pike, King of Prussia, Pa. 19406.

LATTICE, INC.
LMK

Lattice, Inc. has introduced LMK, an automated product generation utility for Microsoft, Corp.'s MS-DOS

Versions 2 or 3 environments.

Once a user specifies relationships of various system pieces in a dependency file, a single LMK command initiates the automatic rebuilding of the system. LMK can perform any executable command, such as invoking a batch text editor to make replacements in a number of files, applying a file comparator to new and old files, updating a data base or running utilities, the vendor said.

Use of LMK requires 128K bytes of random-access memory and a minimum of 320K bytes of disk capacity.

The price of LMK is \$195 per copy. Lattice, P. O. Box 3072, Glen Ellyn, Ill. 60135.

TEXAS INSTRUMENTS, INC.
LAN:Datatore, LAN:Datatore

Texas Instruments, Inc. has an-

nounced data base management software for TI Professional Computers in 320M Corp. Etherseries local-area networks.

LAN:Datatore and LAN:Datatore were developed by Software Connections, Inc. of Santa Clara, Calif.

LAN:Datatore is a relational data base manager designed for novice users and provides features such as forms design, report writing and query capabilities. Users reportedly can define the information that they want to store and the format in which to store it without learning complex command languages.

LAN:Datatore was designed for application developers and programmers and is said to handle information storage and retrieval, reducing development time in designing applications software. It reportedly offers the same features as LAN:Datatore, except the report writer, which in LAN:Datatore is programmed by the user. LAN:Datatore supports Basic, Fortran, Pascal and assembly, according to TI.

The products are scheduled for delivery this month and are priced at \$945 each in a network version and \$495 in a single-user version.

TI, P.O. Box 809063, Dallas, Texas 75380.

OPEN SYSTEMS, INC.
Materials Management

Open Systems, Inc. has introduced a materials management application software package for manufacturers using IBM PC-DOS and Microsoft Corp. MS-DOS-based microcomputers.

According to the company, Materials Management can track a product from production scheduling to inventory of finished goods. The software is said to produce a master production schedule status report and to print parts requisitions and job schedules.

The software package reportedly interfaces with the vendor's inventory module, permitting generation of inventory status/alert reports, price list, inventory evaluation, detail list and sales analysis.

Cost of the package is \$695. Open Systems, 480 Oak Grove, Minneapolis, Minn. 55403.

KEY-1 COMPUTER SOFTWARE
Keystool Programming Aids

Key-1 Computer Software has announced a software package consisting of utilities and building blocks to improve application development for the postnovice Basic programmer using the IBM Personal Computer or IBM Personal Computer XT.

Keystool2 Programming Aids reportedly includes a screen-creation utility, a combination of a utility and Basic code that automatically produces multifield data-entry modules, a data-entry test utility and a collection of Basic code routines for searching, sorting and data validation. The price is \$95.

Key-1 Computer Software, 178 Spring St., Newport, R.I. 02840.

STSC, INC.
APL/Plus/PC Release 4.0

STSC, Inc. has announced Release 4.0 of the APL/Plus/PC application development system.

The software runs on IBM's Personal Computer, Personal Computer

Continued on page 116

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MICROCOMPUTERS

Continued from page 112

XT, Personal Computer AT and compatibles with 128K bytes of random-access memory under IBM's PC-DOS or Microsoft Corp.'s MS-DOS operating systems.

The package contains documentation; keyboard stickers and placard; a character-generator read-only memory or program; and two diskettes containing the enhanced APL language processor, Help files and revised and expanded APL utilities.

Price is \$695. Updates to registered users of Release 3.0 cost \$90. STC, 2115 E. Jefferson St., Rockville, Md. 20852.

SILTON-BOOKMAN SYSTEMS, INC. Scheduler

Silton-Bookman Systems, Inc. has

announced a program that is designed for scheduling training programs and that runs on the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatible microcomputers.

The Scheduler reportedly handles schedule cutting and pasting, warns of conflicts and prevents double-booking of rooms and instructors. When schedule conflicts arise, the vendor said, the Scheduler provides strategies for resolving them.

The Scheduler is said to print class, room and instructor schedules in a variety of formats. It provides on-line access to all class, room and instructor schedules, the vendor said. The program can operate as a stand-alone tool or can be integrated with the Registrar, the vendor's training and logistics management program.

Requirements for use are an IBM Personal Computer or compatible system with IBM PC-DOS, 128K bytes of random-access memory, two floppy disk drives or one floppy and one hard disk drive and printer. The price is \$349.

Silton-Bookman Systems, Suite 222, 4906 El Camino Real, Los Altos, Calif. 94022.

ALCYON CORP. DPS system

Alcyon Corp. has introduced its DPS system, software which reportedly permits existing applications to run in a multihost network that is transparent to users.

The software reportedly runs on the IBM Personal Computer under LanTech Systems, Inc.'s Unetix or Microsoft Corp.'s MS-DOS and on Al-

cyon micros under Alcyon's Regular operating system. The DPS system is said to offer distributed, operating system capabilities and to feature a remote access methodology that does not require program modification.

DPS, developed jointly by Alcyon and LanTech, is priced at \$450. Alcyon, 8712 Production Ave., San Diego, Calif. 92121.

CHANCELLOR COMPUTER CORP. Symgraph

Chancellor Computer Corp. has announced the Symgraph graphics editor for computer-aided engineering (CAE).

According to a company spokesman, Symgraph operates as part of the Chancellor 1000 and Chancellor 2000 IBM Personal Computer XT-based CAE workstations. It can provide design engineers with high-resolution color graphics and can perform schematic capture and physical layout.

Symgraph reportedly offers a resolution of 1,024 by 768 pixels on a 19-in. screen and 640 by 400 pixels on a 13-in. screen. The user can define the color for up to 50 layers of design, Chancellor said.

Symgraph's color coding facilitates the system's hierarchical design capabilities up to 10 levels of nesting. The editor's other graphics features include continuous pan and zoom, five different view and windowing commands and eight drawing and digitizing modes.

Symgraph is priced at \$16,000 as part of the Chancellor 1000 system or at \$21,000 as part of the Chancellor 2000 system.

Chancellor Computer, 1101 San Antonio Road, Mountain View, Calif. 94043.

LOGICWARE, INC. Mprolog for IBM micros

Logicware, Inc. has introduced versions of the artificial intelligence language Mprolog for the IBM Personal Computer, Personal Computer AT and Personal Computer XT.

Versions of Mprolog were also introduced for systems running under Charles River Data Systems, Inc.'s Unos; Techtronix, Ltd.'s Unix/ix; and Unisoft Corp.'s Unisoft.

Mprolog is said to be a micro version of Mprolog mainframe software. The software reportedly permits AI applications to be created in modules and allows a full AI program to run in any environment, provided a version of Mprolog exists for it.

Mprolog for the Personal Computer, Personal Computer AT and Personal Computer XT is priced at \$725. Mprolog for supermicros leases, for \$200/mo and is sold for \$6,000.

Logicware, Suite 600, 1000 W. Finch Ave., Toronto, Ont. M3J 2V5.

FOX RESEARCH, INC. 10-Base Release 2.0

Fox Research, Inc. has introduced a new version of its 10-Base data base management system (DBMS) that reportedly features a procedural language processor and user-oriented power boosters to IBM's Sequel mainframe software.

10-Base Release 2.0 is a relational DBMS designed to be used in conjunction with local-area networks such as the vendor's 10-Net.

Improvements to Release 2.0 re-



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MICROCOMPUTERS

portedly include a date-data-type feature, enhanced forms manager, data entry, SELECT command, error messages, multiuser support, batch processing, full screen editor, define/query editor and search function in data entry.

10-Base runs on the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatibles; the vendor said. It reportedly supports IBM's PC-DOS 2.0 and higher and Microsoft Corp.'s MS-DOS 2.0 and higher, requiring 256K bytes of random-access memory, a cursor-addressable screen with 25-line by 80-char. resolution and two disk drives.

Price is \$405 for a single-user version, \$895 for a network version. Updates will be available for existing 10-Base Release 8.0 customers for a material-handling charge, the vendor said.

Pax Research, 7005 Corporate Way, Dayton, Ohio 45459.

MAINSTAT SOFTWARE CORP.
Mainstat

Mainstat Software Corp. has announced Mainstat, an application development software package designed to run on IBM's Personal Computer XT and Personal Computer AT.

Mainstat reportedly combines a mainframe-like analytical data base management system with a user interface that can be readily tailored. According to the vendor, the package is designed to allow value-added resellers to build custom software products.

The product reportedly combines virtual memory techniques and an unstructured data base analysis with a user interface for application developers. It is said to include built-in analysis and forecasting capabilities.

The package runs on an IBM Personal Computer XT or AT with 512K bytes of internal memory.

Single copies of Mainstat sell for \$1,495.

Mainstat Software, Suite 801, 1745 Stout St., Denver, Colo. 80202.

SYSTEMS

TELEVIDEO SYSTEMS, INC.
Telecolor PC; Telecolor XT

Televideo Systems, Inc. has announced Telecolor PC and Telecolor XT, IBM Personal Computer-compatible microcomputers that provide color and graphics capabilities.

The micros feature an Intel Corp. 8088 microprocessor, 356K bytes of random-access memory, an adjustable 12-in. screen and Microsoft Corp.'s MS-DOS operating system. They reportedly support 16-color selection in text mode and four-color palette selection in graphics mode.

The Telecolor PC has dual 5¼-in. disk drives with 720K bytes of storage; the Telecolor XT features one 360K-byte disk drive and a 20M-byte hard disk drive.

Telecolor PC costs \$2,995. Telecolor XT sells for \$4,595.

Televideo Systems, 550 E. Brokaw St., San Jose, Calif. 95112

MAI/BASIC FOUR
INFORMATION SYSTEMS, INC.
MAI 3000 Management System

MAI/Basic Four Information Systems, Inc. has announced the MAI

3000 Management System, said to run business application software developed in Business Basic for MAI/Basic Four's microcomputers.

The MAI 3000 Management System features Base/IX, an AT&T Unix-like operating system developed by MAI. Base/IX is said to be capable of linking with more than 80 other MAI 3000s in a local-area network called Management Assistance General Network, also announced by the company.

Multiple systems are physically connected by two-wire twisted pairs up to 4,000 ft. long, with each system connected by a drop cable to a local-area network tap box.

The MAI 3000 is based on the Motorola, Inc. 68010 microprocessor and comes with a main memory of 768K bytes. Each system can hold six

Continued on page 118

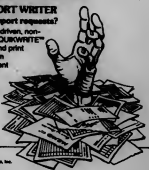
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MICROCOMPUTERS

Continued from page 117

memory boards of up to 256K bytes each and up to 16-bit controller boards. Two disk storage devices are also provided, with either two 5¼-in. Winchester hard disks or one hard and one floppy disk.

The MAI 2000 also comes with two serial ports expandable to 14. Communications are compatible with IBM's 2780 and 3780 binary synchronous protocols.

The price for the MAI

2000 with 22M-byte Winchester disk drive, 130 char./sec. printer, VDT and the Base/IX operating system is \$14,250. Deliveries are scheduled for February.

MAI/Basic Four Information Systems, 14101 Myford Road, Tustin, Calif. 92680.

BOEING COMPUTER SERVICES CO. EIS Micro Workstations

Boeing Computer Services

Co. has introduced four EIS Micro Workstations incorporating the IBM Personal Computer AT.

Two of the workstations are based on the 256K-byte Personal Computer AT Model 068 and two on the 512K-byte Model 090. The EIS workstations reportedly link the Personal Computers to Boeing's Mainstream remote computing services mainframe computers.

In connect mode, the workstations can automatically log on, access EIS data bases, upload and download and emulate an IBM 3270 terminal, Boeing said.

The EIS Micro Workstations based on the Personal Computer AT Model 068 are priced at \$5,700, including a one-year Mainstream processing credit of up to \$250/mo. and \$7,800, including a one-year Mainstream processing credit of up to \$350/mo.

The EIS Micro Workstations based on the Model 090 are priced at \$7,500, including a one-year Mainstream processing credit of up to \$355/mo. and \$9,200, including a one-year Mainstream processing credit of up to \$425/mo.

Boeing Computer Services, 7309 Gallows Court, Vienna, Va. 22180.

DATAPOINT CORP. Vista-PC monochrome version

Datapoint Corp. has introduced a monochrome version of its Vista-PC.

The monochrome Vista-PC reportedly can be used in a local area network and can be linked to other workstations. It is said to be able to display either text or text and graphics and to be priced about \$900 less than a version with a color monitor.

The price of the monochrome Vista-PC ranges from \$2,870 for a text-only cluster workstation to \$5,770 for a 10M-byte graphics workstation.

Datapoint, 9725 Data-point Drive, San Antonio, Texas 78284.

SORD COMPUTER OF AMERICA, INC. Sord IS-11C version

Sord Computer of America, Inc. has unveiled a briefcase-size version of its Sord IS-11 Consultant (IS-11C).

The IS-11C reportedly provides a 25-line by 80-char. LCD display with a flip-back screen that can be positioned for maximum readability. Resolution is said to be 640 by 200 pixels, allowing improved display of data for word processing and spreadsheet programs.

Word processing, communications and preprogrammed management utilities are included in read-only memory (ROM). According to the company, the word pro-

cessing incorporates 14 advanced commands into Copy, Move, Search, Replace and Underline and is the equivalent of the desktop version.

The IS-11C reportedly includes 80K bytes of random-access memory (RAM) and 72K bytes of ROM. An optional cartridge provides an additional 64K bytes of RAM, while a built-in microcassette provides 128K bytes of storage per tape. Standard ports are said to be RS-232C, parallel, printer, bar code and numeric key pad.

An optional ROM pack houses Sord's DB-Pipe database program, which includes spreadsheet, data base and business graphics. Other optional ROM packs in-

clude Sord's I-Basic; I-Trans data transfer program for input to Microsoft Corp.'s MS-DOS; IBM's PC-DOS and Digital Research, Inc. CP/M programs; and I-TSS, a time-sharing module providing links to data banks.

Scheduled for delivery in early 1985, the IS-11C costs \$1,495.

Sord Computer of America, 645 Fifth Ave., New York, N.Y. 10022.

CIE SYSTEMS, INC. 690/190; 690/390

CIE Systems, Inc. has extended its Cies 690 family of Unix-compatible, multuser microcomputers with the introduction of the 690/100

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MICROCOMPUTERS

and the 680/200 systems.

According to a company spokesman, the systems feature Intel Corp. Multibus architecture and include a central processor; high-speed bus; high-density, dual-ported random-access memory (RAM); and an intelligent I/O controller.

Both systems use a 10-MHz Motorola, Inc. 68000 CPU with on-board memory management designed for zero wait states.

The 680/100 supports between four and 12 users, CIE said. The system comes with 512K bytes of RAM (expandable to 1M byte), a 500K-byte floppy disk drive and up to 92M bytes of Winchester disk storage.

The 680/200 is said to support up to 40 users and to provide between 512K and 2M bytes of RAM and up to 356M bytes of hard disk storage.

The systems reportedly feature dual-bus architecture, using Multibus, to provide a common path for communications among all modules in the system, including memory and direct memory access peripheral device controllers. That feature is augmented by Intel's Local Bus Extension, which provides a 19M byte/sec data path between CPU and memory, a spokesman said.

The intelligent I/O controller is available as an option on the 680/100 and is standard on the 680/200. Each controller incorporates an Intel 8088-2 microprocessor with 64K bytes of dynamic RAM and 32K bytes of erasable programmable read-only memory. I/O buffering, input character checking, parity checking and parity generation are provided for up to eight serial devices.

The 680/100 is priced between \$14,995 and \$30,000, and the 680/200 begins at \$29,995, according to the vendor.

CIE Systems, P.O. Box 16579, 2515 McCabe Way, Irvine, Calif. 92713.

TOMCAT COMPUTER, INC. Tomcat 3200-AT

Tomcat Computer, Inc. has introduced its Tomcat 3200-AT personal computer, said to be compatible with the IBM Personal Computer AT.

The Tomcat 3200-AT is available in two models. The low-end model consists of a 512K-byte CPU with a 1.2M-byte diskette drive only, Tomcat said.

A second, enhanced model includes 640K bytes of memory, a 1.2M-byte diskette drive, a 20M-byte hard disk storage unit, serial and parallel ports and a color board, according to the vendor.

The low-end model costs \$2,995. The enhanced model is priced at \$4,346.

Tomcat Computer, Suite 508, 545 S. Spring St., Los Angeles, Calif. 90013.

to distribute information throughout an IBM Systems Network Architecture, Systems Center said.

Other features include the capability to schedule unsolicited data transmissions and distribute program information updates to any microcomputer on a network, the vendor said. The product is said to provide a standard interface to microcomputer applications.

NBM-PC costs \$2,500 for a local-area computer or \$300 for single microcomputer connections.

Systems Center, 2989 Campus Drive, San Mateo, Calif. 94403.

NATURAL MICROSYSTEMS CORP.

Watson for the IBM Personal Computer AT

Natural Microsystems Corp. has announced a version of its Watson voice/data system for the IBM Personal Computer AT.

Watson can operate under the AT's primary operating system, PC-DOS 3.0, and consists of a single circuit board, system software and applications software, Natural Microsystems said. The system reportedly allows the computer, in conjunction with a Touch-Tone telephone, to conduct automatic dialing and time billing and to function as a dictating machine, allowing users to edit and rearrange a message before it is transcribed.

Also said to be included are 300 or 1,200 bit/sec modems and the capability to permit the computer to act as an electronic voice calendar.

Watson for the Personal Computer AT is priced between \$849 and \$995, depending on modem speed.

Natural Microsystems, 6 Mercer Road, Natick, Mass. 01760.

METRABYTE CORP. MOD-MB

Metabyte Corp. has introduced its MOD-MB modem for the IBM Personal Computer line.

The MOD-MB reportedly is an intelligent modem that plugs into an

expansion slot on the computer's chassis. It is said to be AT&T 212A- and 105-compatible and to feature automatic dialing, automatic answering and 14 other serial commands. Its autodialer reportedly can be programmed to dial either voice or data calls.

The MOD-MB also features an auxiliary RS-232C port for connecting a printer, Metabyte said.

The MOD-MB is priced at \$345. Metabyte, 254 Thaco Drive, Slough, Mass. 02072.

NOVELL, INC. Network 4.6

Novell, Inc. has announced enhancements to its Netware operating system for the IBM Personal Computer AT and PC-DOS 3.0.

Netware 4.6 reportedly supports the computer as a local-area network file server and workstation and provides customized disk drivers for the data storage products of such third-party vendors as Talgrass Technologies, Inc. and Daving Systems, Inc.

Its Netware/Remote feature reportedly allows remote personal computers to connect to a network as if they were locally attached.

Netware 4.6 is priced at \$1,695. Novell, 1170 N. Industrial Park Drive, Orem, Utah 84057.

AT&T TELETYPE CORP. SSI Irms

AT&T Teletype Corp. has introduced SSI Irms, a terminal emulation package that allows an AT&T Personal Computer 6300 to emulate an IBM 3278 Model 2 or 3279 Model 2A terminal.

By using either System Network Architecture/Synchronous Data Link Control or Bisynchronous 3270 protocols, the micro can access host software that supports IBM 5640 cluster controllers, AT&T said. Personal computers can tie into a 3270 series network by attaching to a 5644 or 5646 controller port. The product does not require modem or communications line support, AT&T said.

Continued on page 121

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COMMUNICATIONS

SYSTEMS CENTER Network Dataover-PC enhancements

Systems Center has enhanced Network Dataover-PC (NDM-PC), which connects an IBM Personal Computer to a mainframe running IBM's MVS operating system.

The enhancements include a coaxial cluster controller connection, the ability to submit distribution work to other computers and the capability

to manage project management problems.

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MICROCOMPUTERS

Continued from page 119

It includes a circuit card, a version of Digital Communication Associates, Inc.'s Irma emulator program and two file transfer utilities.

SSI Irma costs \$1,106.

AT&T Teletype, 5555 W. Joshua, Skokie, Ill. 60077.

POINT 4 DATA CORP. PC Connection

Point 4 Data Corp. has announced PC Connection, which allows an IBM Personal Computer to tie into Point 4's multiuser Iris operating system.

In Iris mode, the microcomputer works as an Iris workstation, and utilities allow any Personal Computer file to be copied to or from the Iris host, according to the vendor. With a single keystroke, the user reportedly can return to IBM PC-DOS operating system mode.

The product provides two file locking facilities that prevent two users from simultaneously updating the same file. One prevents the locked file from being read while the second allows the user to read but not write in the file, the vendor said.

PC Connection costs \$550.

Point 4 Data, 2569 McCabe Way, Irvine, Calif. 92714.

PHILIPS INFORMATION SYSTEMS, INC. Communications Coystem

Philips Information Systems, Inc. has introduced its Philips Communications Coystem, a voice/data terminal designed for use with the Philips F3100 Personal Computer and the IBM Personal Computer.

In a point-to-point network, the Coystem reportedly allows electronic mail, transmission of data files and several intelligent telephone functions, including use of a 400-name data base. The Coystem is said to be compatible with existing private branch exchange systems and to feature 92K bytes of internal memory, a 1,200 bit/sec modem and a speakerphone.

The Coystem is priced at \$2,595.

Philips Information Systems, Suite 300, 15301 Dallas Freeway, Dallas, Texas 75248.

UIS CO. Vistacom 4.0

UIS Co., a division of Control Data Corp., has released Version 4.0 of Vistacom, a micro-to-mainframe communications software package that reportedly allows an IBM Personal Computer, Personal Computer XT and Personal Computer AT or a Texas Instruments, Inc. Professional Computer to act as an interactive terminal and transfer files to and from a host system.

Vistacom 4.0 includes an increased data transmission rate, a secure file transfer protocol and the ability to interact with the IBM PC-DOS operating system without exiting a Vistacom session.

The Vistacom 4.0 reportedly uses a proprietary data transmission protocol based on the Open Systems Interconnect architecture of the International Standards Organization. The new Files capability is said to allow users to perform a variety of DOS directory and utility functions. Full directory access is available.

The product sells for \$200.

UIS, 9300 Metcalf, Overland Park, Kan. 66212.

INTELLIGENT TECHNOLOGIES INTERNATIONAL CORP. SNA Exchange for Concurrent PC-DOS

Intelligent Technologies International Corp. has announced Systems Network Architecture (SNA) Exchange for IBM Personal Computers, Personal Computer XT's and compatibles running Digital Research, Inc.'s Concurrent PC-DOS operating system. The product is said to allow communication with IBM mainframes via IBM's SNA protocol.

With the product, the Personal Computer user reportedly can communicate with a host while running Digital Research's CP/M 86 and PC-DOS applications. The windowing feature of Concurrent PC-DOS is said to permit the display of IBM 3270, CP/M 86 and PC-DOS applications on

the same screen.

SNA Exchange is said to provide SNA/Synchronous Data Link Control communications and emulation of the IBM 3274 cluster controller. The price for SNA Exchange for Concurrent PC-DOS is \$895.

Intelligent Technologies International, 151 University Ave., Palo Alto, Calif. 94301.

AGS MANAGEMENT SYSTEMS, INC. PAC Micro Project Management System

AGS Management Systems, Inc. has announced PAC Micro Project Management System, said to convert PAC Micro data so it can be read by a mainframe.

PAC Micro runs on the IBM Personal Computer, Personal Computer

XT, Personal Computer AT and compatibles. The program is said to provide for planning, scheduling, tracking progress and costs and assigning resources.

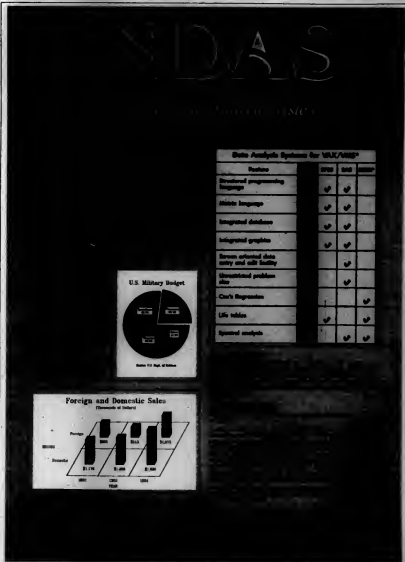
By connecting PAC Micro to the AGS Management Systems' mainframe project management systems, such as PAC II or PAC III, the data is converted into a format required for mainframe use, the vendor said.

The price for PAC Micro is \$900. AGS Management Systems, 600 First Ave., King of Prussia, Pa. 19406.

THIRD FLOOR SYSTEMS, INC. Mydesk

Third Floor Systems, Inc. has announced Mydesk, a computerphone and desk management package said

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MICROCOMPUTERS

Continued from page 121
to allow IBM Personal Computers, Personal Computer XT, Personal Computer ATs and compatibles to interface to standard private branch exchange (PBX) systems without requiring a modem.

Features reportedly include a personal telephone directory of up to 300 entries, advanced telephone and PBX dialing features, billing time and clock and a calculator. The package also offers one-keystroke access to telephone dialing features, menu selections and on-line, context-related Help, the company said.

The interface board takes up one I/O slot. The recommended configuration includes a micro with at least 128K bytes of random-access memory and IBM's DOS 2.0 or 2.1 operating systems.

Mydesk is priced at \$199.

Third Floor Systems, Suite A114, 1630 Oakland Road, San Jose, Calif. 95131.

TELEVIDEO SYSTEMS, INC. PM/SNA

Televideo Systems, Inc. has announced PM/SNA, which provides IBM Systems Network Architecture capabilities for Televideo's Personal Mini multiuser computer line.

The product reportedly consists of two parts: software that includes a host interface module and device emulation module and hardware that consists of a Synchronous Data Link Control interface card that fits an IBM Personal Computer-compatible bus.

PM/SNA allows up to 15 microcomputers to connect to an IBM mainframe and emulate an IBM 3274 control unit, 3278 display, 3287 printer and 3770 batch terminal, according to the company.

The 3770 batch terminal capability is said to provide file transfers between a Personal Mini terminal and an IBM mainframe.

PM/SNA costs \$1,995.

Televideo Systems, 550 E. Brydew Road, San Jose, Calif. 95112.

KEA SYSTEM LTD. ZSTEMPC

Kea Systems Ltd. has announced ZSTEMPC, which is said to allow an IBM Personal Computer with IBM's PC-

printer and macro programming capabilities, Kea Systems said.

ZSTEMPC costs \$150.

Kea Systems, Suite 412, 2150 W. Broadway, Vancouver, B.C., Canada V6K 4L9.

CIE SYSTEMS, INC. PCworks

CIE Systems, Inc. has released a software link that enables the IBM Personal Computer to communicate with CIE's 680 supermicro-

computer system.

Under PCworks, licensed by CIE from Touchstone Software Corp., the 680 supermicrocomputer running the Alcyon Corp. AT&T Unix-like Regulus operating system is said to act as a network manager.

The package provides file transfer between the 680 and the personal computer, automatically converting the data to the appropriate format, according to the vendor.

The personal computer

user reportedly can store files on a local disk and print reports on a local printer or transfer them to the 680 for storage or printout.

Standard RS-232 ports are used to connect the personal computers to the 680, CIE said. Local personal computers may be cabled directly into the system, and remote personal computers may access it through a telephone modem, according to the vendor.

The price of PCworks is



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\$666; \$340 for the part of the package installed on the 560 and \$225 for the portion on the personal computer, the vendor said.

CIE Systems, P.O. Box 16579, 8515 McCabe Way, Irvine, Calif. 92713.

FOX RESEARCH, INC. SNA Gateway for Fox 16-NET

Fox Research, Inc. has released a 3270 Systems Network Architecture (SNA) Gateway for its Fox 16-NET

local-area network that allows network users with IBM Personal Computers or compatible systems to communicate with IBM mainframes, including the 370, 4300 and 30 series.

Fox and Techland Systems, Inc. of New York jointly developed the hardware/software combination that allows the Gateway unit to act as an IBM 3274 cluster controller.

A User inserts a circuit board in the Gateway unit

and software in other personal computers on the 16-NET network. Up to 64 logical units (personal computers or peripherals) can become part of the Fox 16-NET SNA Gateway net.

The Fox 16-NET SNA Gateway, including circuit board, software and documentation is priced at \$1,900 for 8 logical units and \$3,300 for 16 logical units.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45458.

CYB SYSTEMS, INC. Unite Series

CYB Systems, Inc. has introduced its Unite series of Unix-based network servers for personal computer networks.

The four models reportedly support from four to 32 users. Based on the Motorola, Inc. 68000 processor, the Unite series is said to feature Multibus architecture and AT&T's Unix System V operating system.

Personal Computer users in a Unite series network reportedly run applications written for their machines' native operating systems or log on to the Unite network server as a terminal and run Unix applications.

To join a Unite network, a personal computer reportedly needs a serial port and 102K bytes of memory. Personal computers with modern main gain remote dial-up access to the Unite series network, according to CYB Systems.

Unite series network servers are available in four, eight, 16- and 32-user versions. They are priced at \$9,996, \$15,996, \$24,445 and \$53,996, respectively.

CYB Systems, 6448 Highway 290 E., D-111, Austin, Texas 78723.

BUSINESS COMPUTER CORP.

Intellimodem XL, ST and XT

Business Computer Corp. (Biocomp) has announced three plug-in modems for the IBM Personal Computer line.

The Intellimodem XL, Intellimodem ST and Intellimodem XT operate at 300 and 1,200 bit/sec and offer autoanswer/autohold features, according to Biocomp. The modems reportedly feature the vendor's Intellisoft communications software, unlimited on-line telephone directories and Xmodem error-checking protocol file transfer. The modems operate in full- or half-duplex and are said to be compatible with Hayes Microcomputer Products, Inc. modems.

The Intellimodem ST reportedly implements the Hayes Smartmodem 1200 command set and can run all tested software written for the 1200. The Intellimodem XT is said to include all the features of the Intellimodem ST, plus a minicard design that will fit into all the short slots of IBM Personal Computers.

Prices are \$499 for the Intellimodem ST and \$549 for the Intellimodem XT and XL. Biocomp, 532 Mercury Drive, Sunnyvale, Calif. 94086.

See NETS page 124

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MICROCOMPUTERS

NETS from page 123UNIVATION, INC.
Rainbow LAN Controller

Univation, Inc. has released a controller board that links Digital Equipment Corp. Rainbow microcomputers into a local-area network.

Users connect the Local Area Network Controller (LAN Controller) to the Rainbow's transceiver device, then hook into Ethernet with

a standard Ethernet cable, according to Univation.

Network Research Corp. in Santa Monica, Calif., provides Fusion, the Xerox Corp. Memory Systems (XMS) protocol software needed to implement the network, a spokesman said.

LAN Controller features reportedly include buffer management with three received packets and one transmit packet, four 8-bit data channels and loop-back for test diagnostics.

The cost of the Rainbow LAN Controller is \$750. Fusion software carries an additional \$750 price tag.

Univation, 1037 N. Fair Oaks Ave., Sunnyvale, Calif. 94089.

STORAGE

AST RESEARCH, INC.
Colossus

AST Research, Inc. has in-

troduced a disk subsystem for the IBM Personal Computer family that features a 67M-byte Winchester disk drive and a 60M-byte 34-in. streaming tape cartridge backup.

Colossus, designed for use with the IBM Personal Computer, Personal Computer XT and Personal Computer AT, features 30-msec access time on the hard disk drive, according to the vendor.

The subsystem, enclosed in a single case, is said to use

a modular design to ease service of components and system expansion.

A chassis slot is provided for future boards that will enable Colossus to interface directly with local-area networks, such as the AST-PCnetII, and with non-IBM personal computers.

Shipments are scheduled for January. The suggested list price is \$7,499, according to the vendor.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

LANCORE
TECHNOLOGIES, INC.
PC Core 45; PC Core 75

Lancore Technologies, Inc. has introduced a line of disk/tape mass storage systems for personal computers that allows for the sharing of files and resources on up to seven workstations without application software modifications.

The intelligent file servers, PC Core 45 and PC Core 75, provide up to 75M bytes of formatted capacity and selective and turnkey automatic off-line backup. The units have an Intel Corp. 80186 CPU with 128K bytes of random-access memory, five expansion sockets and a 16-bit data path.

The PC Core 45 unit costs \$5,995. The PC Core 75 unit, with a larger Winchester disk and streaming tape drive, is priced at \$6,995.

Lancore Technologies, 31324 Via Colinas, Westlake Village, Calif. 91362.

ALLOY COMPUTER
PRODUCTS, INC.
Qicstor-Plus

Alloy Computer Products, Inc. has introduced Qicstor-Plus, a subsystem that provides five expansion slots, hard-disk storage and file-oriented streaming tape backup capabilities for the IBM Personal Computer.

The hard-disk capability supports from 20 to 128M bytes of storage, has an access time of 28 msec and is designed as a file-server in a multitier system, Alloy said.

The streaming tape facility has a formatted capacity of 40M bytes on a cartridge tape and backs up a hard disk at the rate of 2M bytes/min, the vendor said. The product requires 256K bytes of random-access memory.

A 20M-byte Qicstor-Plus sells for \$5,595.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

RACET COMPUTES LTD.
PCMS-150

Racet Computes Ltd. has announced PCMS-150, a storage system designed for the IBM Personal Computer.

PCMS-150 reportedly consists of a 150M-byte hard disk drive, a 150M-byte streaming tape backup and

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MICROCOMPUTERS

operating and diagnostic software. The system interfaces with IBM's PC-DOS operating system and provides large central files with password control, the vendor said.

The system's hard disk storage reportedly can be backed up in less than 30 minutes. The product is said to be compatible with Ethernet networks.

PCMS-150 costs \$14,900, according to the vendor.

Racet Computers, 1855 W. Katella Ave., Orange, Calif. 92667.

IONEGA CORP. Bernoulli Box version

Ionega Corp. has announced a 5M-byte version of its Bernoulli Box, a removable cartridge disk drive, for Apple Computer, Inc.'s Macintosh microcomputer.

Applications for the Bernoulli Box with the Macintosh are said to include primary, backup and archival storage. The high capacity of each cartridge allows loading of multiple programs, thereby reducing the frequency of floppy disk changes, the vendor said.

The cartridges hold 5M bytes of formatted data and are completely interchangeable from drive to drive, a spokesman said. The unit is said to have an average access speed of 50 msec. Cartridges cost \$50 each.

Ionega, 4646 S. 1500 West, Ogden, Utah 84403.

PRINTERS/ PLOTTERS/ PERIPHERALS

PERSONAL COMPUTER PRODUCTS, INC. DaisyLaser 1000

Personal Computer Products, Inc. has announced the DaisyLaser 1000 letter-quality laser printer for use with systems having RS-232 serial or Centronics Data Computer Corp.-type parallel interfaces.

The DaisyLaser is said to print at a rate of eight page/min and to be based on a Canon USA, Inc. LBP-CX laser printer engine, with a controller developed by Personal Computer Products.

Features include a forms generator that works from standard word processing software such as Micropro International Corp.'s Wordstar, and three read-only memory cartridge slots for font and form loading. Font selection is eight fonts per page standard, with 16 fonts per page as an option.

DaisyLaser weighs 50 lb and measures 19.7 in. wide by 16.3 in. deep by 16 in. high. Prices for DaisyLaser begin at \$3,495.

Personal Computer Products, 11590 W. Bernardo Court, San Diego, Calif.

PANASONIC INDUSTRIAL CO. TX-12HSP, TX-122MYP, TX-122M9P, BT-P4500D

Panasonic Industrial Co. has introduced four terminals: a 12-in. color terminal, two 12-in. monochrome displays and a 40-in. color terminal.

The 12-in. color display, TX-12HSP, produces 16 colors and features a tilt-and-swivel stand, Panasonic said. The 80-line by 25-char. display reportedly offers 740-

by 580-pixel resolution.

The monochrome monitors are said to feature etched facelplates. The 80-char. by 25-line terminals have a bandwidth of 35 MHz and support either graphics or text, the vendor said. The TX-122MYP has yellow characters, while the TX-122M9P has green characters.

The 40-in. display's circuitry provides a 16-color display for the IBM Personal Computer and Apple Com-

puter, Inc.'s Apple III. The BT-P4500D provides 640-by 240-pixel resolution.

TX-12HSP costs \$600, TX-122MYP sells for \$250, TX-122M9P is priced at \$240 and BT-P4500D costs \$4,995.

Panasonic Industrial, One Panasonic Way, Secaucus, N.J. 07094.

DIGITAL EQUIPMENT CORP.

Letterprinter \$10

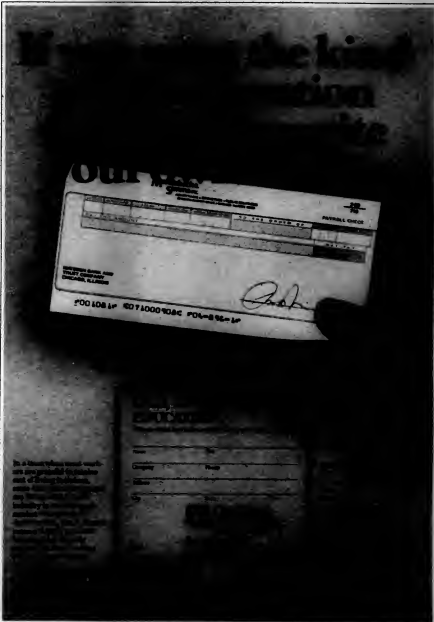
Digital Equipment Corp.

has released the Letterprinter \$10 dot matrix printer, said to be compatible with all of DEC's computers. It is also reportedly compatible with IBM's Personal Computer, Personal Computer XT, Personal Computer AT and compatibles.

The Letterprinter \$10 can selectively emulate the IBM Graphics Printer and Epson America, Inc. MX80 printers, DEC said.

The printer reportedly

Continued on page 126



MICROCOMPUTERS

Continued from page 125

handles text at 240 char./sec in draft-quality mode and 40 char./sec in near-letter-quality mode and delivers bit-mapped graphics in both DEC and IBM modes. Options include a bi-directional forms tractor, a single-sheet feeder and a user-installable IBM/Centrronics Data Communication Corp. parallel interface for personal computer connection.

Price of the Letterprinter 210 is \$1,595, two foot cartridges and the parallel interface cost \$125.

DEC, Maynard, Mass. 01754.

XEROX CORP.

Xerox/Diablo Systems, Inc.
Advantage D35

Xerox Corp. has announced a 25 char./sec letter-quality printer designed to operate with most micro-

computers.

According to a company spokesman, the Xerox/Diablo Systems, Inc. Advantage D35 daisy-wheel printer was designed for heavy office use in word processing and other text- and graphics-related applications.

The product's All-Purpose Interface reportedly allows it to be connected via serial or parallel interface to most micro, including the IBM Personal Computer.

The D35 features automatic proportional spacing, automatic carriage returns and bidirectional printing, Xerox said. The printer reportedly offers variable line and column spacing and automatic paper loading. It also accommodates a bidirectional tractor and single-bin sheet feeder.

The printer is priced at \$745.

Xerox, Xerox Square 006, Rochester, N.Y. 14644.

C. ITOH DIGITAL PRODUCTS, INC.

Prowriter 7800

C. Itoh Digital Products, Inc. has introduced its Prowriter 7800, a dot matrix printer with graphics capability and optional IBM Personal Computer compatibility.

The Prowriter 7800 reportedly features an 80- to 132-char. column width and prints at 105 char./sec. It is said to be available with either an RS-232C serial port, an IBM Personal Computer-type parallel port or a Centronics Data Computer Corp.-type parallel port. It is said to feature 8-by-9-wire dot matrix and 8-by-5-wire dot matrix.

It is priced at \$260.

C. Itoh Digital Products, Suite 230, 19750 S. Vermont Ave., Torrance, Calif. 90502.

TEXAS INSTRUMENTS, INC.

Model 860 XL, Model 865

Texas Instruments, Inc. has introduced two wide-carriage versions of the company's Model 860 and Model 865 printers.

According to the company, the Model 860 XL microprinter prints draft copy at 160 char./sec in a nine-by-nine matrix and correspondence-quality copy at 35 char./sec in a 10-by-18 matrix.

The Model 865 is a letter-quality printer with a 35 char./sec capability in a 32-by-18 matrix, the company said.

The Model 860 XL, available in the first quarter of 1985, sells for \$899. The Model 865 sells for \$1,299.

Texas Instruments, Dallas Systems Group, P.O. Box 509063, Dallas, Texas 75350.

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3 THE PROGRAMMER'S CP/M HANDBOOK.

Andy Johnson-Laird. Here is the single most comprehensive information source on CP/M you can purchase. Includes descriptions of CP/M's internal structure, the CP/M file system, Basic Disk Operating System, Basic Input/Output System, utility programs, and more. As a daily resource for the serious CP/M systems programmer, this handbook is an absolute must. Hardcover. Publisher's Price: \$32.95.

3 THE BYTE GUIDE to CP/M-86.

Mark Dahlquist. Now you can get the full story on CP/M-86—the program specifically designed for today's most powerful and advanced microcomputers. From one of the leading computer publications, this guide clearly describes how CP/M-86 will operate with microcomputers. CP/M is a registered trademark of Digital Research, Inc.

using Intel 8086 or 8088, including the IBM Personal Computer. All commands and utility programs are discussed, along with application programs and support for high-level languages such as BASIC, Pascal, FORTRAN and COBOL. Softbound. Publisher's Price: \$26.95.

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Computerworld 12/10/84

VISAGE from page 107

RAM, one floppy disk drive, one 10M-byte hard disk drive, touch screen and mouse. Prices for the systems, all reportedly available by early 1985, range from \$6,995 to \$11,950.

Development software bundled with the system includes Visage's Microsoft Corp. MS-DOS-compatible V-DOS operating system; the company's V-Exec 2.0 videodisk virtual device interface; V-Basic, an interpretive Basic compatible with Microsoft's Basic; and V-Paint I and II graphics packages.

Visage also offers interfaces to IBM compiled Basic, IBM Pascal, IBM Macro Assembler, Lattice, Inc.'s Lattice C and Ashton-Tate's Dbase II, each available now for \$295. In addition, Learncom, Inc. is offering its System for Authoring Microtraining menu-driven development program for the series.

The V-Link 1500 and V-Link 1550 plug-in video controllers are designed for the IBM Personal Computer and compatible machines with at least 256K bytes of RAM. Both offer RGB output and on-board 256- by 192-pixel graphics with 16 colors. The V-Link 1500 accepts 320- by 200-pixel graphics with four colors from an IBM color graphics adapter, while such graphics are resident on the V-Link 1550. The two products cost \$1,850 and \$2,150, respectively.

Visage's VXP packaged upgrade kits feature a choice of monitors, V-Link boards, software and cables and are priced between \$1,850 and \$4,715. Among other options are the \$975 Pioneer LD-V4000 videodisk player, an \$850 bit pad package and a \$125 mouse.

Industrial training represents the primary business application for interactive video today, noted Nathan Kalowski, Visage marketing vice-president. "There's a very high return on investment for companies with a large number of people to train or complex products," he claimed. "The more complex the message, the better this media is."

Kalowski predicted that several trends would boost business use of interactive video systems, including use of IBM Personal Computers and compatibles as development and delivery systems, less expensive and more capable videodisk players, lower costs and quicker turnaround in mastering videodisks and increased selection of video programs.

Visage is located at 12 Michigan Drive, Natick, Mass. 01760.

MICROCOMPUTERS

MAC from page 107

In 1984, interest centered on integration, and packages such as Lotus Development Corp.'s Symphony, Ashton-Tate's Framework and Ovation Technologies, Inc.'s Ovation captured the headlines. These packages were disappointing. Symphony has not been as successful as Lotus' 1-2-3. Ashton-Tate has admitted that Framework sales have not reached expectations. Ovation died unborn — a slow, painful death.

Why has IBM Personal Computer innovation slowed? The microcomputer is three years old. When it was first announced, vendors began designing packages not for the Personal Computer of 1981, but for the Personal Computer of

1982 or 1983. They began working on a Personal Computer with 256K bytes of random-access memory (RAM) or a hard disk. When IBM announced these enhancements, vendors were able to roll out their products quickly. Unusual packages were steadily produced.

As one requirement for this trend to continue, IBM had to continue providing more RAM. IBM ran into a roadblock at 640K bytes of RAM because Microsoft Corp.'s MS-DOS operating system was not capable of directly addressing more memory.

This summer, IBM announced the Personal Computer AT, which would run Microsoft's Xenix and address 3M bytes of RAM. But Xenix shipments were not

scheduled until the first quarter of 1986, and some developers doubted IBM's commitment to that operating system.

No blockbusters expected

Consequently, there have not been any blockbuster Personal Computer AT products. And there probably won't be any for the next six to 12 months.

As the IBM Personal Computer hit a roadblock, Apple announced the Macintosh. It, too, had a limited amount of RAM: at first 128K bytes, now 512K bytes. But it offered developers a new operating environment with a user-friendly interface and powerful graphics capabilities — features the IBM product lacked.

In addition, the Macintosh promised developers a large base of first-time users, hungry for software.

"Since the IBM market had already been developed, software vendors can have only limited success in it," Lefkowitz claimed. "They [vendors] are threatened not only by IBM's recent software announcements, but

also by the installed base of 1-2-3, Ashton-Tate Dbase and Microsoft International Corp. Wordstar users."

So developers are turning to the Macintosh. "They would rather work with the Macintosh," Lefkowitz said. "Even though it is more difficult to develop software for the Macintosh, [the micro] offers companies a better potential return on their investment."

And, for the moment, innovation has become synonymous with Macintosh.

One example is Pilevision, by Telon Software Products, which combines DMS facilities with the Macintosh's graphics capabilities and

creates a data base that stores images as well as text. This may be the first of a series of products that truly integrate graphics with traditional applications.

The leading vendors also are making their moves. Lotus has unveiled Jaws, a Symphony-like package for the Macintosh, to positive initial reviews. "The Macintosh gave Lotus an excuse to correct the biggest problem with Symphony," said Morton Rothenblatt, chairman of Corporate Software, Inc. of Waltham, Mass. "The user interface in Jaws is much improved; no longer does everything have to go through the spreadsheet."

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SYS-ED

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ny, whose Cambridge, Mass., firm specializes in research in corporate computing.

Regarding local-area networks, Colony predicted that IBM will find its Personal Computer network directly competing with — and defeating — the IBM Cabling System by 1986. The Cabling System is much more costly, and the Personal Computer Network, which he recommended for those needing a local network, will receive a great deal of third-party vendor support, he said.

As for the departmental resource processor, Colony said it currently faces several barriers, including the need for better data base security on the mini, incompatibility between personal computer and minicomputer software packages and the fact that there currently is "no such thing as a distributed data base."

An additional barrier is the need for software site licensing, so that software may reside on the mini and be downloaded to end users when they need it. "The software industry is going to have to respond to this, because it's coming," he claimed.

A departmental resource processor networked with a group of personal computers will also need to be able to reach up to the corporate mainframe for data not stored locally, requiring a high level of compatibility between all of the computers in the system, he said.

"That's why IBM will look so strong in the future," Colony argued.

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COMPUTER INDUSTRY

STC files financing plan Seeks to borrow \$80 million from subsidiary

LOUISVILLE, Colo. — Storage Technology Corp. (STC) and its financing subsidiary last week filed a financing plan with a federal bankruptcy court that would allow the company to borrow \$80 million from the subsidiary.

The proposed agreement would permit STC to borrow the cash assets of its Storage Technology Finance Corp. Those assets include about \$80 million in notes and accounts receivable and about \$60 million in accounts receivable that the parent firm collected but did not transfer to its subsidiary.

The agreement provides that the subsidiary's creditors would receive a "superiority" claim on \$44 million of the parent firm's assets. The subsidiary would also have priority claim on another \$96 million of the parent's assets, subject to proof that the parent has borrowed additional funds from its unit.

Filed Chapter 11 petition

Both the parent firm and subsidiary have filed Chapter 11 petitions under the U.S. Bankruptcy Act. Under Chapter 11, a company is protected from creditors' claims while it works out a court-approved reorganization plan with its creditors.

In a separate matter, an industry source confirmed recent published re-

ports that STC has received a \$10 million order from IBM for tape drives and controllers. IBM, STC's principal rival in the data storage business, has reportedly been unable to meet demand for its 3590 Model 2 tape controllers because of a shortage in a circuitry part used in the controllers.

"Computer and Communications Buyer," a New York newsletter covering the used-equipment market, reported that IBM will use the tape drives to meet its own internal operations, thus freeing up IBM's tape systems for its own customers.

Neither IBM nor STC would comment on the sale of the equipment.

Hearing scheduled

A hearing on the joint financing plan is scheduled today in the federal bankruptcy court in Denver.

The plan already has been approved by separate creditors' committees representing the parent firm and its subsidiary.

Last month, Chemical Bank of New York decided not to go ahead with a previously announced loan commitment of \$150 million to STC. STC later announced it would lay off 1,200 workers at its facilities in Colorado and Florida (CW, Nov. 26).

■ Honeywell, Inc. plans to sell its Syntek, Inc. semiconductor subsidiary and lay off 1,000 U.S. employees/122

■ A Future Computing, Inc. executive predicts that IBM's Personal Computer AT won't make a black sheep of one of its family members, the Personal Computer XT/123

■ Boeing Co. expands its efforts in artificial intelligence technology by acquiring a \$1.6 million equity interest in a Pittsburgh company specializing in such research/126

Durango shifts focus to compete with IBM AT

By Kathleen Burton
CW West Coast Bureau

SAN JOSE, Calif. — When Durango Systems, Inc. conceived the Poppy II microcomputer last year, IBM's Personal Computer AT was nothing but a gleam in Big Blue's eye. But in an industry where change is a byword, yesterday's good ideas can become tomorrow's headaches.

Durango faces just such a headache today, now that IBM's multistep Personal Computer AT, scheduled for April release, will compete directly with Durango's Unix-based Poppy II product, a Personal Computer AT look-alike.

"Durango shot an arrow into the wall, and IBM, with the AT announcement,

drew a target around it," said Len Baker, a Durango director and partner in Sutter Hill Ventures, a Palo Alto, Calif., venture capital firm that backed the company.

However, IBM's August announcement made the Poppy an immediate industry standard, Baker claimed, largely because of the Personal Computer AT's limited availability. The Poppy's sales have since doubled.

The Intel Corp. 80186/80286-based Poppy II, which can handle as many as 14 users, was initially designed as a general-purpose unit to compete with Altos Computer Systems, Inc. and Fortune Systems Corp. offerings, not IBM's, claimed Durango President Jim Simpson. Although the

Personal Computer AT announcement legitimized the Poppy concept, he said, the company cannot survive by going head-to-head with Big Blue.

According to Simpson, Durango must rapidly change direction, searching out market niches and shifting its focus to major OEMs and value-added retailers and dealers. Durango recently signed a major OEM agreement with Molecular Computer, Inc., based here, and is discussing a similar agreement with major IBM Bunch competitors in the \$150,000+ computer markets, Simpson said.

Durango also will target smaller, vertical market companies, Simpson said, be-

See POPPY page 144

Treasury's tax overhaul proposal gets mixed reaction

By Mitch Davis
CW Washington Bureau

WASHINGTON, D.C. — The computer industry greeted the U.S. Department of the Treasury's recent proposal for a major overhaul of corporate taxation with a mixed reaction, reflecting the fact that different segments of the industry favor different provisions of the existing tax code.

The Treasury plan generally repels the business community's most coveted tax credits and deductions in return for reducing the corporate income tax rate from 46% to 33%. The plan is aimed at simplifying the tax code, ridding it of loopholes and eliminating its bias toward certain types of investments, officials said.

Of particular interest to the computer industry, the Treasury plan repeals the 10% investment tax credit but revives the R&D tax credit; replaces the accelerated depreciation schedule enacted in 1981

with a less generous depreciation system; and repeals the preferential treatment for long-term capital gains.

The Computer and Business Equipment Manufacturers Association (Cbema) here strongly supported the Treasury tax reform proposal, particularly retention of the R&D credit and lowering effective corporate tax rates. "For too long, major high-tech companies have suffered under high taxes," said Vico E. Henriques, Cbema president. "We've been paying more than our share, while at the same time, our products were contributing to productivity in every economic sector."

Henriques said Cbema is not concerned about losing the 1981 accelerated depreciation system. "That doesn't bother us because it didn't help us in the first place," he said, noting that the depreciation schedule favors investments in industrial plants and equipment.

In contrast with Cbema's general support of the Treasury plan, small and mid-size electronics firms and venture capitalists were outraged with the plan, saying it would end the preferential tax treatment given to long-term capital gains. (Under current law, the maximum tax rate on long-term capital gains is 20%, rather than the 50% maximum rate applied to ordinary income. The Treasury plan would tax the profits of investors in start-up enterprises the same as other income, although gains through inflation would be discounted.)

The American Electronics Association (AEA) in Palo Alto, Calif., strongly opposed the capital gains proposal, arguing it could cut off the investment capital that has fueled the growth of high-risk electronics firms.

Dean O. Morton, AEA chairman and the chief
See TAXES page 143

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COMPUTER INDUSTRY

Honeywell plans layoff of 1,000 workers at Synertek

By David Glens
CW Staff

MINNEAPOLIS — Honeywell, Inc. last week announced plans to lay off 1,000 employees at its semiconductor subsidiary, Synertek, Inc., and said it is making plans to sell the unit.

The layoff will affect most of Synertek's 1,200 U.S. employees at facilities in Santa Clara, Calif., and Santa Cruz, Calif. A substantial number of the 500 employees working at a Synertek facility in Singapore also will be laid off, Honeywell said.

The company said there will be no layoffs at its Syn-

ertek's sales.

"The major ROM business is doing very poorly," said a spokeswoman for the Semiconductor Industry Association, a trade association in San Jose, Calif.

"Obviously, anyone who is heavily directed in that market is not doing well now," she added.

Synertek sustained large

operating losses in 1983 and 1984, Honeywell said.

A company spokeswoman said the unit was unsuccessful in its efforts to diversify by manufacturing semiconductor chips for industrial markets.

The unit experienced delays in new product development, which the company attributed in part to high

turnover of engineering personnel in Silicon Valley, she said.

Honeywell said it expects to take a substantial write-off of the assets and reserves for costs related to the layoffs in the fourth quarter. However, according to Toonheim, it was too early to determine the amount of the write-off.

The unit experienced delays in new product development, which the company attributed in part to high turnover of engineering personnel in Silicon Valley.

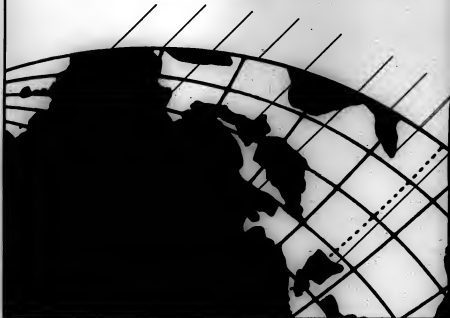
ertek plant in Bangkok, Thailand, which will remain open to handle packaging and subcontract work while the business is offered for sale.

The subsidiary's design center in Munich, West Germany, will also not be affected by the layoff, according to Honeywell.

Kathy Toonheim, a Honeywell spokeswoman, said that discussions are being held with interested parties about purchasing Synertek, but she would not elaborate on the purchase.

In a statement, H. D. Elverum, Honeywell executive vice-president, said the company "examined several alternatives for Synertek, but all of them included contin-

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COMPUTER INDUSTRY

Exec predicts XT survival despite doomsayers' forecast

By Kathleen Sullivan
 CW West Coast Bureau

SAN FRANCISCO — When IBM introduced the Personal Computer AT last August, many observers said the announcement of the Intel Corp. 80286-based computer signaled the beginning of the end for one of its other Personal Computer family members — namely, the Personal

Computer XT.

But Ron Ward, executive vice-president of Future Computing, Inc., a Richardson, Texas-based market research group, said he believes the Personal Computer XT will retain a solid following in the company's microcomputer lineup.

Speaking at a recent seminar, Ward said the system

will endure because the Personal Computer XT, along with the Personal Computer, brings in the bulk of the firm's microcomputer revenue.

'Workhorse sells'

"The [Personal Computer] and XT combinations are the workhorse units; they are the cash cows of the com-

pany's Personal Computer line," Ward said.

But more important, Ward said, IBM will continue to offer a "Personal Computer-speed" machine because it has recognized the importance of offering a full range of micro products, from home computers to stand-alone business machines to multiuser systems, and will con-

tinue to follow that strategy.

IBM's product family will continue to evolve, however, in order to stay off competitors and meet changing market conditions. Looking ahead to 1985, Ward predicted the possible additions and adaptations to IBM's product line:

■ The Personal Computer II, to be introduced in 1985, will represent a "cost-reduced Personal Computer" and will be based on Intel's 8086 microprocessor.

■ IBM will introduce a briefcase-size, battery-powered portable computer that uses 3½-in. floppy disks in mid-1985 or early 1986.

■ In 1985, IBM will extend the power of its PCjr by adding 256K-byte chips and a hard disk drive. In addition, a portable Personal Computer AT will be introduced.

■ By 1987, the Personal Computer AT will be upgraded with 256K-byte chips and the addition of optical disk storage. That same year, IBM will introduce a 80386-based successor to the AT that will use 1M-bit chips and will feature an optical disk.

■ In 1988, IBM will unveil a 80286-based ATjr. By then, the firm will be questioning the viability of its 80085-based product line," Ward said.

He indicated that 1985 heralds "revival time" for the microcomputer industry. With IBM's recent product introductions, the market is poised for new growth.

New market opportunities

In some ways, the market opportunities in 1985 will parallel those of 1982, when hundreds of companies joined the industry following the introduction of the Personal Computer, according to Ward. Existing companies will discover new market opportunities in 1985, and new products will be introduced."

However, added Egil Juliusson, Future Computing's chairman, differences exist between the two situations that should also be noted, especially in the supply-and-demand picture. Shortages of the Personal Computer gave rise to the Personal Computer-compatible industry in 1982, he noted. While Juliusson predicted that the demand for the AT will exceed the supply in 1985, he said the shortage will not be as great as in 1982 and 1983.

He said IBM's Entry Systems Division, which produces the Personal Computer line, is better prepared to handle the demand, having increased its manufacturing capacity by a factor of 10. Also, the market itself has changed; in 1985 the industry will experience slower growth rates and a slower expansion of its dealer base.

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COMPUTER INDUSTRY

IBM's albatross: A history lesson for micro makers

By David G. Dykstra
Special to CWT

Second of two parts

IBM was one of the first personal computer makers with its line of 5100 series computers, which it introduced in 1975. The first models had a small screen and a cumbersome operating system and computer language for small computers. They did not include word processing or other individual productivity tools, such as electronic spreadsheet, data base or file management packages. They also did not use the Basic programming language. These computers were, therefore, misdirected toward accounting and business management,

not toward good, single-user applications.

IBM sold many of the 5100 series machines on the strength of the IBM name, and many independent developers wrote software packages to run on these computers. In the following years, more computers were sold based on the number of packages that were available. Several thousand packages were available for the 5120, which was the last of this series. Unfortunately, many customers who bought 5100 models based on the quantity of software found the quality of the packages and software vendor support not very good.

In the meantime, some of the other major companies in the computer in-

dustry were making and marketing personal computers for appropriate, single-user applications. For example, Wang Laboratories, Inc. was marketing personal computers for word processing and engineering uses and Hewlett-Packard Co.'s line was directed toward engineering. Lantier Business Products, Inc. and Lexington/Raytheon Data Systems Co. were specializing in word processing.

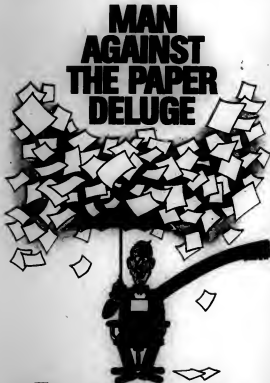
The retail personal computer industry received its initial impetus from Radio Shack, with its chain of retail outlets and large potential computer- and technology-oriented customer base. Apple Computer, Inc. and Commodore Business Machines, Inc. began marketing through third-party

outlets. All three included Basic or other relatively easy programming languages, and low-cost word processing packages were available.

The introduction of Software Arts, Inc.'s Visicalc, available for most personal computers, (except the IBM 5120 because of its inappropriate operating system) gave the personal computer industry a tremendous shot in the arm. Visicalc and other similar and enhanced packages have made the single-user computer a valuable tool for increasing productivity.

In 1979 and 1980, sales of IBM's 5120 computer had leveled off at an estimated \$1 billion per year. This represented, by far, the largest share of the personal computer market of any company. Customer complaints, however, were growing, and the product's deficiencies were becoming more evident. Many of the 5120 software developers had abandoned ship and were supporting programs for more state-of-the-art products.

In 1981, IBM introduced the Personal Computer with one of the most



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Most business failures will be those of opportunists who fail to heed sound management practices. There will be a larger share of failures by those who try to go head-to-head with Big Blue.

effective advertising campaigns and public relations blitzes that the computer industry has experienced. The discontinuation of the 5120 was not announced until long after the fact. By the time the media realized that IBM had discontinued the 5120, few wanted to report it because it was not news. IBM had not only successfully launched a new product, but it had quietly buried an albatross.

IBM will continue to grow and prosper. There will continue to be many business failures in the computer industry. Most will be the failures of opportunists who fail to heed sound management practices. There will be a disproportionately larger share of failures by those who try to be IBM-compatible and go-head-to-head with Big Blue.

The total number of companies in the computer industry will continue to grow as entrepreneurs invent new products and identify new needs. Many emerging niche markets will become future major markets. The companies that continue to be innovative and serve their customers' needs will continue to grow.

Dykstra is president and owner of Dykstra Consultants, a Newport Beach, Calif.-based independent consulting firm. He teaches at the Irvine campus of National University and is the author of Computers for Profit, recently published by Keeton Publishing Co.

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COMPUTER INDUSTRY

GSA's Section C micro purchases expected to rise in '85

By Andrew Mohr
Special to CW

The General Services Administration (GSA) has issued its schedule contract solicitation for the purchase of microcomputer hardware, software and maintenance. The solicitation encompasses a wide range of end-user computers, including stand-alone personal computers, portables and multiuser, multitasking equipment servicing numerous users.

Known as the Section C schedule, it is one of the government's primary contractual vehicles for purchasing microcomputers and related products. During fiscal year 1984, the government spent approximately \$50 million on microcomputers purchased from Section C vendors. The amount spent on microcomputers under Section C this year is expected to rise substantially.

GSA schedule contracts are indefinite quantity contracts awarded to

numerous vendors.

To ensure that the government receives a fair deal, GSA negotiates discounts from a vendor's commercial price list before awarding a schedule contract to a vendor. After award, the government is not obligated to buy any goods or services from the contractor.

According to the solicitation, GSA will award a single Section C schedule contract for each make, model or line of hardware offered. Vendors offering equipment under the schedule must also offer maintenance and repair services.

However, GSA may award separate schedule contracts for third-party maintenance services.

Software may be sold either together with hardware or as a separate item under software-only schedules. In a change from the current schedule practice, agencies may procure only one of the same model software package for each micro acquired. If an agency desires to purchase two or more of the same software package, then it must acquire the software from the software-only schedule vendor, whose price for the package will generally be lower than that of schedule vendors offering both hardware and software.

Manufacturers and dealers may bid on the Section C schedule solicitation. Dealers bidding on the Section C

schedule solicitation must obtain a product support letter from the manufacturer of the equipment proposed to ensure a source of supply for the duration of the contract.

It should be noted that agencies are not required to use Section C and may procure micro, software and maintenance from non-schedule vendors. But to do so, agencies must comply with the more rigorous rules governing the acquisition of non-schedule products.

Mohr practices at the law firm of Cohen & White in Washington, D.C., specializing in federal procurement and computer law.

Suit settled against Telink for \$3 million

NASHVILLE, Tenn. — Northern Telecom, Inc. said last month that it had settled a legal claim against one of its former contractors, Telink, Inc., which has agreed to pay a \$3 million settlement.

The claim alleged that Telink, a Santa Ana, Calif., subsidiary of Burnup & Sims, Inc., had violated the federal Racketeer Influenced and Corrupt Organizations Act in connection with a \$24 million microwave, private-branch exchange and telephone contract in San Diego county.

Under terms of the settlement, Telink has agreed to pay all trade debts owed Northern Telecom, as well as damages and legal expenses associated with the two-year legal dispute. Northern Telecom said that the total settlement is \$3 million, with payment of damages guaranteed by Burnup & Sims of Plantation, Fla., and by an independent bonding company.

Telink also agreed to discontinue any lawsuit it had filed against Northern Telecom charging wrongful termination of Telink's factory-authorized contractor agreement. Northern Telecom said it will pay no damages for suit dismissal.

Last month, Telink, two of its executives, Burnup & Sims and 11 other individuals — including some former county officials — were indicted by a federal grand jury on charges of racketeering, mail fraud and wire fraud in connection with the San Diego County contract and other telecommunications contracts.

Northern Telecom said the settlement with Telink came from the indictment was issued.

In June 1982, the San Diego County Board of Supervisors voted to award the telecommunications contract to Telink. Northern Telecom, which manufactured the system called for in the award, bid \$5.6 million less for the contract. The award resulted in a lawsuit and a grand jury inquiry.

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COMPUTER INDUSTRY

Boeing acquires AI interest

PITTSBURGH — In an effort to expand its development of artificial intelligence technology, Boeing Co. recently said it has acquired a \$1.6 million equity interest in the Carnegie Group, Inc., an AI company here.

Boeing also said it has agreed to contracts with the Carnegie Group valued at \$4 million or more over four years for the development of knowledge-based software systems.

Four scientists from Carnegie-Mellon University founded the Carnegie Group in February 1983. The company specializes in designing and developing knowledge-based systems for the manufacturing process, such as sensor-based machine control and diagnosis, and knowledge-based man-

agement decision-support systems.

Last year, Boeing established an AI center in Bellevue, Wash., operated under the aegis of Boeing Computer Services Co., a division of the Seattle-based aerospace giant.

Robert L. Dryden, president of Boeing Computer Services, said the agreement would allow the company to expand its AI programs by gaining access to technologies from the Carnegie Group.

George Roberts, general manager of the Boeing unit's Advanced Technology Applications Division, said Boeing "will perform a portion of [its] contract work on advanced technology products at the Carnegie Group facility in Pittsburgh."

AT&T offers program to ensure Unix-based software portability

NEW YORK — AT&T recently announced a software program said to be designed to ensure the portability of application software running under its Unix System V, future releases and various System V derivatives offered by AT&T licenses.

The principal element of the AT&T program is the System V Interface Definition, a document that reportedly defines the relationship between an application program and System V.

The document defines a minimum set of system calls and library routines that should be common to all operating systems based on System

V. The remaining commands and utilities have been grouped into a logical series of optional extensions to the basic definition, AT&T said.

AT&T said that the goal of the program is to have applications written under the System V definition execute unchanged on any system that conforms to that definition.

AT&T is located at 196 Broadway, New York, N.Y. 10007.

Fujitsu units to run Pick

SANTA CLARA, Calif. — Fujitsu Microelectronics, Inc., a subsidiary of Japan's Fujitsu Ltd., has announced that it has entered into a licensing agreement.

The licensing agreement is to offer the Pick and Associates, Inc. Pick operating system on Fujitsu business computers.

According to a Fujitsu spokesman, the company has not decided which of its processors will be equipped with the Pick operating system and what those systems will cost.

He said Fujitsu products with Pick, a multiuser operating system, probably will be released during 1986.

ISI, ADR reach DBMS agreement

WALNUT CREEK, Calif. — Integral Systems, Inc. (ISI) and Applied Data Research, Inc. (ADR) have announced a marketing agreement.

The agreement is said to enable ISI's on-line, interactive human service system to operate with the ADR/Ideal fourth-generation software development system and the ADR/Datcom/DB relational data base management system (DBMS).

ADR will assist ISI in developing versions of its payroll and personnel system for ADR's relational DBMS.

AEA fills three board positions

PALO ALTO, Calif. — The American Electronics Association (AEA) recently elected three corporate executives to its national board of directors.

The new directors will serve on the AEA's 62-member national board. They are Horace G. McDonnell Jr., president and chief executive officer of Perkin-Elmer Corp.; William T. Yivisker, chairman and chief executive officer of Gould, Inc.; and Charles E. McKittick Jr., vice-president of governmental programs at IBM.

The AEA is located at 2600 El Camino Real, Palo Alto, Calif. 94306.

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COMPUTER INDUSTRY



SUPERSHORTS

Computer Sciences Corp. has received a \$14.1 million subcontract from IBM for services in the design competition phase of the Federal Aviation Administration's (FAA) advanced automation system program.

During the 36-month design phase of the program, IBM and a team led by Hughes Aircraft Co. will develop competitive designs for the advanced automation system. The FAA will then select one contractor to produce and install the system. This will provide new computer software, new processors and new controller work stations, known as sector suites.

Magnetic Peripherals, Inc. announced that it plans to reduce the work force at its Oklahoma City plants. Approximately 20% of the current full-time work force will be terminated or reassigned as production ceases by year-end 1984.

The decision to discontinue production at the plant stems from the poor market for floppy drives caused by severe price erosion.

Hyundai Group, Korea's largest company, has announced its new \$40 million microelectronics facility in Santa Clara, Calif.

The new 100,000-sq-ft facility would house headquarters, marketing, engineering and manufacturing operations for Hyundai's wholly owned U.S. subsidiary, Hyundai Electronics America.

Beehive International Ltd. has announced that its wholly owned subsidiary, Beehive Ireland Ltd., is entering into an orderly and voluntary wind-down of its manufacturing facility located in Fermoy, Ireland.

Beehive International is in the process of signing agreements with the customers of Beehive Ireland to continue the supply of Beehive products to those customers directly from Beehive's Salt Lake City plant.

Beehive Ireland intends to pay all sums presently owing to suppliers and to work out acceptable arrangements with its bank and with the Irish development authority with respect to certain loans and grants it has received.

Onyx + IMI, Inc. announced that it has consummated an agreement with Computer Memories, Inc. to sell the technology, manufacturing rights, inventory and assets for a new family of half-height, 5¼-in. Winchester disk drive products for which development by Onyx + IMI has been substantially completed.

The agreement provides for the sublease of certain facilities and grants Computer Memories a worldwide license to use Onyx + IMI's patents, trade secrets and other proprietary information for the development, manufacture and sale of these half-height products.

Onyx + IMI previously announced its plans to divest itself of its disk drive division. The company had estimated that it would be necessary to establish a \$10 million aftertax reserve associated with the divestiture.

Gould, Inc. has opened a corporate office in China.

The new office in Beijing will coordinate

all of the sales and marketing activities for Gould's four electronics business segments with Chinese government industrial ministries.

In July, the company also signed a 10-year licensing agreement with the China National Machinery and Equipment Import and Export Corp. in Beijing for the manufacture and assembly of industrial computers called programmable controllers.

The Foxboro Co. and Hewlett-Packard Co. have announced the formation of a strategic partnership designed to provide integrated information networks for use in the process industries.

The agreement focuses on an OEM arrangement that makes available information-based systems using Foxboro process control technology in combination with HP distributed

data processing and real-time systems.

Xidex International, a division of Xidex Corp., announced that it has signed a three-year equipment, raw materials and technology agreement with the Shaoxi Provincial Electronics Industry Corp. of China. A dollar amount was not disclosed.

The agreement calls for Xidex to provide hardware, raw materials and technical support for a complete floppy disk assembly facility to be in operation in Shaoxi province by early 1986.

General Electric Information Services Co. has announced its new disaster recovery services business. Located in Schenectady, N.Y., the disaster recovery services facility contains mainframe equipment from

Honeywell, Inc., IBM and Hewlett-Packard Co., as well as related peripheral devices, telecommunications links, office and work space.

Disaster recovery services provide a "hot" site facility for use by subscribers whose own computer facilities have been destroyed or disabled. This service is designed to fit the needs of Fortune 500 companies operating their own data centers.

D.W. McArthur, group vice-president, information systems group, at IBM Corp., has been elected chairman of the board of the Computer and Business Equipment Manufacturers Association (Cbema). Richard Douglas, group vice-president, U.S. marketing and service, Honeywell Information Systems, Inc., was elected board vice-chairman.

Ronald Guller, vice-president of

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COMPUTER INDUSTRY

government affairs for the Multiphysics division of AM International, Inc., has been elected chairman of Chema's joint plans and policies committee. A. Raymond Daniels, director of industry standards and relations at NCR Corp., was named vice-chairman of plans and policies.

Applied Computer Technology Ltd. (ACT), a UK firm, has announced the formation of a Santa Clara, Calif.-based company that will be responsible for overseeing U.S. marketing efforts of ACT's Apricot microcomputer line.

The new company, **Apriest, Inc.**, will receive approximately 20% of its initial capital of \$20 million from ACT. The balance of the funds required for working capital and for financing the initial promotional expenditure is expected to come from

ACT's own shareholders and other institutional investors.

Ing. C. Olivetti & Co., S.P.A. and **Filenet Corp.** have announced an agreement in which Olivetti will distribute overseas the recently introduced **Filenet document-image processor system**. The equipment will be sold directly by Olivetti, which will also provide field service support.

South Korea's Daewoo Telecom Co., Ltd. has signed a long-term contract with U.S. vendor **Leading Edge Products, Inc.** to provide the American firm with personal computers designed and manufactured by Daewoo Telecom.

The products will be marketed by **Leading Edge** in North, South and Central America and in Europe and Australia. The companies will mar-

ket the products jointly in Asia and Africa.

The **Napa Division of Emspak Corp.** has selected **Ariel Communications Corp.** to provide fiber-optic systems for communications in its advanced, high-resolution computer graphics systems.

The **Napa Division** will market **Ariel's** fiber-optic interfaces as an optional feature in its computer graphics systems.

Deltak, Inc., a Prentice-Hall, Inc. subsidiary, and **Software AG** of North America, Inc. have announced an agreement to codevelop and co-market multimedia and computer-based training for **Software AG** software products.

Network Research Corp., Santa

Monica, Calif., and **Spartacus Computers, Inc.**, Bedford, Mass., have entered into a joint marketing agreement making available a high-performance connection between IBM mainframes, IBM and compatible personal computers and non-IBM workstations.

Stryk, Inc. announced last month that it has filed a registration statement with the U.S. Securities and Exchange Commission regarding its proposed initial public offering of two million shares of common stock.

The estimated offering price is between \$10 and \$12 per share. The proposed new offering consists entirely of newly issued shares to be sold by the company, which intends to use the proceeds to repay bank debt, purchase capital equipment and add to working capital.

MEMBERS AND ACQUISITIONS

Xidex Corp., Mountain View, Calif., and **Evoetek Corp.**, Fremont, Calif., jointly announced that an agreement has been reached under which **Xidex**, a wholly owned subsidiary of **Xidex Corp.**, will acquire 100% of the common stock of **Evoetek**. **Xidex** will move from its Campbell, Calif., facility to the **Evoetek** facility.

Linear Corp., Carlsbad, Calif., has purchased controlling interest in **Security Science Corp.** of America, Inc., Scottsdale, Ariz. Terms of the acquisition were not available.

An agreement in principle has been reached on the purchase of the **Monroe Systems for Business** division of **Litton Industries, Inc.** by a group of private investors headed by **Jeffrey M. Plover** and **R. V. Williams** and including **Robert F. Kane**, **Monroe's** president.

The leveraged buyout is subject to the completion of definitive agreements, approval by **Litton's** board of directors, financing and certain governmental approvals. Terms of the proposed transaction were not disclosed.

Computer Task Group, Inc., Buffalo, New York, announced it has acquired **Anastec Systems Corp.** of Los Angeles. Terms of the acquisition were not available.

Agilis Advanced Systems Corp., Farmingdale, N.Y., has agreed in principle to acquire **Playtex Computer, Inc.**, also of Farmingdale, and, concurrently, establish an additional DP service support facility at the **World Trade Center** in New York. The acquisition is subject to several conditions, including the approval of the transaction by the shareholders of **Playtex's** Group Companies, Inc.

Control Data Corp., Sunnyvale, Calif., announced the acquisition of **Computer Marketing Association (CMA)**. CMA is a vendor of maintenance services for computers manufactured by **Digital Equipment Corp.**. Terms of the agreement were not disclosed.

American Computer Hardware Corp. (ACHC), Santa Ana, Calif., and **San Francisco**, page 142

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COMPUTER INDUSTRY

MERGERS

from page 141

Systech Corp., San Diego, announced the completion of the purchase of **Systech's Burroughs Corp. Interface** division by **ACRC**. ACRC is currently expanding its product lines and becoming a more visible company to both the general computer industry and to the computer-buying public. With this acquisition, ACRC acquires an existing working interface for use with the Burroughs line of minicomputers.

Terms of the agreement between the firms were not available.

Motorola, Inc., Schaumburg, Ill., announced the acquisition of **CTX International**, Sunnyvale, Calif., for an undisclosed amount of cash. The privately held company will become part of Motorola's newly formed en-

terprises organization.

Printrolix, Inc., Irvine, Calif., announced it has completed the acquisition of **Anadex, Inc.**, a privately held California-based company that is engaged in the design, manufacture and sale of serial matrix computer printers. The acquisition was completed through a merger of Anadex into a newly formed, wholly owned subsidiary of Printrolix in exchange for 380,948 shares of Printrolix common stock.

The new subsidiary will continue to conduct business with its former management under the name Anadex.

Money Management Systems, Inc., Waltham, Mass., has been acquired by **Strategic Information, Inc.**, Burlington, Mass. Terms of the

acquisition were not disclosed.

Seagate Technology, Inc. and **Grenex Corp.**, Scotts Valley, Calif., jointly announced that they have reached an agreement in principle for Seagate's acquisition of Grenex in exchange for not more than 3.5 million shares of Seagate common stock.

The transaction is subject to completion of a definitive agreement, approval from the board of directors of both companies and the Grenex shareholders and customary regulatory approvals.

MTI Systems, Port Washington, N.Y., a division of **Ducommun, Inc.**, announced that an agreement in principle has been reached to acquire **Gedatacom, Inc.**, Pittsburgh. Details of the purchase agreement were not disclosed.

Computer Identics Corp., announced it has reached an agreement in principle with **N.V. Bakker S.A.**, a Belgian corporation, whereby Bakker would purchase 800,000 shares of Computer Identics common stock.

The two companies recently announced an intent to form a joint-venture Belgian company to sell, service and manufacture bar code systems and equipment in Western Europe.

Communications Corp. of America (CCA), Dallas, announced the completion of an agreement with **Telle Access and Thomson-CSF** Telephone.

Telle and Thomson, both French companies affiliated with **Compagnie Generale D'Electricite**, a \$7 billion international company headquartered in Paris, purchased one million shares of CCA's common stock at \$10 per share.

Under the terms of the agreement, Telle and Thomson have a two-year option to purchase from CCA up to 2.5 million additional shares of common stock at \$10 per share.

CCA further announced the signing of a distributorship agreement with **Thomson CSF Communications** wherein CCA will be a nationwide distributor of the Opus key system products manufactured by Thomson CSF Communications.

American Bancserv Corp., has acquired **Veridian Corp.**, Lakeland, Fla., a microcomputer software company, in exchange of stock. Terms of the agreement were not available.

McGraw-Hill, Inc., New York, acquired, for cash, the capital stock of **Occidental Consulting Group, Inc.** (Oxcon) of Lafayette, Calif.

Oxcon produces a series of test instruments, or profiles, that are used by businesses to screen and select the best candidates for specific jobs. The system was designed to help businesses improve their selection of employees, and thus increase productivity and reduce turnover.

MSI Data Corp., Costa Mesa, Calif., announced it had completed its acquisition of **Anurata, Inc.** of Redmond, Wash.

The purchase price of Anurata, consisted of an initial payment of 45,000 shares of common stock made at closing and a payment of additional shares may also be made by MSI in early 1986. The quantity is dependent on the level of Anurata revenue achieved within a specified minimum-dollar range during the next 12 months. No revenue estimate for this period was given, but MSI did say that the 1984 level is expected to be between \$5 million and \$6 million.

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COMPUTER INDUSTRY

BTU, Ulvac form company to market chip processing equipment in Japan

NORTH BILLENCA, Mass.— BTU Engineering Corp. said it has formed a joint venture with Ulvac Corp., a Japanese company, to market semiconductor processing equipment in Japan.

The new company, Ulvac-BTU, will initially market diffusion, oxidation and chemical vapor deposition systems made by BTU. The joint venture company plans

to build its own system eventually, using technology and components provided by BTU.

Ulvac is a manufacturer of high-vacuum semiconductor production equipment.

According to BTU, the joint venture company will begin operations at a plant in

Chigasaki City, Japan, but will eventually move to a new manufacturing facility in Tsubu Science City, a large research center near Tokyo.

BTU said Ulvac-BTU plans to produce 30 to 40 processing systems during its first year of operation.

NEC, Corvus to develop controller

LAS VEGAS— Corvus Systems, Inc. and NEC Corp. recently announced an agreement here to develop a single-chip controller for Corvus' Omninet local-area network.

Presently, the controller function for Omninet is implemented with a three-chip set developed by Corvus, a company based in San Jose, Calif.

According to the firms, the Cmos single-chip controller will be manufactured and distributed by Tokyo-based NEC to Corvus and Omninet licensees.

Corvus claimed the one-chip version will allow simpler and lower cost implementation of the transporter than the three-chip set. It will also provide higher performance and expanded functionality, according to the company.

TAXES from page 129

operating officer at Hewlett-Packard Co., stated, "The capital gains differential is the very lifeblood of America's high-risk, high-technology companies."

Morton said the 1978 reduction in capital gains rates sharply increased the volume of venture capital investment.

"During the eight years prior to the reduction in capital gains rates, investments made available to venture capital funds averaged only \$50 million per year. In 1983, \$4.1 billion in new risk capital was made available for investment in new ventures and growth companies," Morton said.

Charlotte LeGates, a spokeswoman for Comex, said the association is not concerned about the capital gains proposal. "That's really a small-company issue and not significant to our members," she said.

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COMPUTER INDUSTRY

Ashton-Tate appoints chief

CULVER CITY, Calif. — Ashton-Tate announced last week that Edward M. Eber Jr. has been named chief executive officer. Eber succeeds David C. Cole, who abruptly resigned the position of chairman and chief executive officer in late October.

The microcomputer software company also an-

nounced that Carmelo J. Santoro, who had served as active chairman since Cole's resignation, has resigned the interim position. Santoro, who is chairman of the board and chief executive officer of Silicon Systems, Inc. in Tustin, Calif., will continue to serve on Ashton-Tate's board.

Eber joined Ashton-Tate

in May as executive vice-president in charge of marketing and sales. He has since been appointed chief operating officer and was elected to the board of directors.

Executive committee planned

Ashton-Tate also announced the formation of an executive committee that will perform the functions of chairman and concentrate on long-term planning, according to the company.

Ashton-Tate said it has no immediate plans to fill the vacant chairman's position.

Last month Cole was appointed president and chief operating officer of Ziff Corp., a company that has holdings in information services companies and computer publications.

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POPPY from page 129

cause they are risk-takers and are driven more by price and performance considerations than are Fortune 1,000 companies. "The Fortune 1,000 [firms] are in a freeze, waiting [for] the clash of the titans [between IBM and AT&T] to eventually resolve itself," he said. "Who knows how long that will take!"

Robert Lefkowitz, director of microcomputer systems software research for the market research firm Infocorp of Cupertino, Calif., and a former Durango employee, said "the company has been in serious trouble for the last three years" and has not been profitable for more than two years. One strength, however, has been aggressive overseas sales, which account for half of Durango's sales, and a strong, though relatively untested, manufacturing capability.

With product life cycles now averaging three years, Lefkowitz said, "the clock is already ticking on the AT." And because the Poppy is months ahead of IBM's product, OEMs making hardware "build-or-buy" decisions may opt for Durango's product, he said.

On the downside, however, the personal computer shakeout has made both vendors and venture capitalists nervous. This may impact Durango, which is now in "a cash-poor, production ramp-up mode," Lefkowitz said. Vendors may insist on steeper cash payment terms in the short run, and future financing may be hard to obtain. Lefkowitz said the total venture capital investment in Durango after more than seven rounds of financing since 1977 is approximately \$17 million.

Infocorp predicted the Unix market to reach \$2 billion this year.

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Impell Corporation has recently joined forces with Comshare Engineering and has achieved a recognized position within the AEC industry. We are a fast-growing leader and have embarked on a well-funded joint CAD/CAM venture with a major industry vendor. We are seeking an aggressive and highly motivated individual to lead a newly formed software development team. The successful candidate will report to the Director of our new product development group and will be based in the San Francisco Bay Area.

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We offer an outstanding compensation package, including incentives and a full range of benefits. If you have a high motivation to succeed and feel you can make a significant contribution to a start-up group such as ours, forward your resume to: Deborah Salsburg-Warlick, Technical Recruiter Dept. # C-2129 Impell Corporation, 250 Montgomery Avenue, San Francisco, California 94104. EOE M/F/H/V/AA/CC/DD.

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RCA Systems Development

RCA Service Company (a subsidiary of RCA Corp.) is under contract to design, develop, and maintain state-of-the-art data acquisition, real-time tracking, interactive graphic displays and data processing systems composed of Gould 58/870 Control Processors and Intel 8088 embedded micro computers.

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Sr. Systems Analysts

Sr. Staff position engaged in systems planning, requirements specification, feasibility and justification studies. Participate in algorithm development, system output analysis and performance evaluation. Scientific BS required (MS preferred) and related experience. (NEWPORT)

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Experienced with Gould Concept 30 systems, MPX 31 or 32 Internals, troubleshooting systems level problems, assembly, and diagnostics. Degree preferred. FORTNATH a plus. (BAHAMAS)

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Design, develop, implement, and document real-time, FORTRAN applications software. Specific assignments include: Applications software, alphanumeric display processing, graphics, error analysis and plotting, requires BS/CS and experience. (NEWPORT)

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NOL II LARGE SYSTEMS BURROUGHS SOFTWARE ANALYST

If you have experience in large systems (NOL II) and are currently employed by a major corporation, then we need to talk. We are a leading software development and consulting firm. We are currently seeking experienced software analysts to join our team. We offer a competitive salary and benefits package. We offer a competitive salary and benefits package. We offer a competitive salary and benefits package.

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(602) 998-1111

Operations Director

Barclays/American Corporation is a multibillion dollar diversified financial services institution and is the North American affiliate of Barclays Bank International... the world's tenth largest bank. In the past ten years, Barclays presence in the U.S. has increased from 40 offices in four states to over 500 offices in 37 states and from 1000 employees to well over 7,000.

Presently, we are seeking an Operations Director for our Data Processing Department. The Operations Director is responsible for the management of the computer operations function, the systems network control center, and service control department.

Qualified candidates must have 12-14 years of data processing experience (7-10 years in operations and 5-6 years in systems development) in the financial services or insurance industry. Individual must be experienced in IMS, VA, CICS, YPM. A knowledge of HOGAN is also desirable.

Barclays/American Corporation is located in Charlotte, North Carolina and offers an excellent salary, comprehensive benefits and relocation assistance. For confidential consideration, send your resume indicating your salary expectations to:

Employment Manager

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Buffalo, N.Y. 14208
(716) 885-0771

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Product Manager

Let NCR's UNIX*-based systems strengths advance your career

NCR's the name for long-term dedication to the UNIX marketplace. Our systems advances — that reflect new market needs — provide the right environment for team professionals. Right now we have an excellent opportunity for a highly qualified individual to oversee UNIX-based business systems development.

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You must have at least a BS in Computer Science or Engineering; a minimum of 2-4 years in product development, marketing or direct sales, and knowledge of budgeting and microcomputer markets. Demonstrated ability to plan, schedule and monitor development programs is essential. We will reward your talent with an excellent salary, outstanding benefits, ample career room and a strategic role in our \$3.7 billion computer company. For immediate confidential consideration please send resume and salary history to Mr. Gordon Davidson, Dept. 44-58, NCR Corporation, 3525 Fleet Springs Road, West Columbia, SC 29169 or call collect 803/796-9250.

NCR

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Senior Community Hospital, a progressive multi-hospital system, seeks a dynamic individual with previous demonstrated experience in Department Resource computer applications. Qualified candidates will possess a BS in Computer Science, MS, or equivalent, with COBOL, PL/I, and FORTRAN programming experience with Micro-Manager 3. Dodge Hospital system environment in an (OJ) health care setting is desired.

Contact:

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EOE M/F/H

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City of Milwaukee

Investigate openings now to experienced analysts in Police EDP unit. Must possess Bachelor's degree and at least four years of related software experience. Experience in law enforcement systems is essential. Equivalent experience will be considered. Salary \$31,000 to \$34,000, depending on qualifications, with excellent benefits. Interview immediately: 11/12/84, 9:00 a.m. to 12:00 p.m. at Police Dept., Room 341, 1000 W. Chicago Ave., 3rd Fl., Milwaukee, WI 53233. Call 224-1111 ext. 115.

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Holmes Transportation Inc. seeks an experienced or entry level Computer Operator. System 38 and RPO in a shift. Four 10 hour days: Friday 2 am to 12 pm, Saturday 2 am to 12 pm, Sunday 2 am to 1 am and Monday 6 am to 2 am. Excellent salary and benefits including dental, vision, prescription, and profit sharing. For interview appointment call (617) 872-6661 ext. 115.

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EOE

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COMPUTER PROFESSIONALS

Meet The Challenges at Our Advanced Technology R&D Center
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Responsible for defining and controlling the hardware and software business computer needs of the Research Center. Will assist in the configuration, implementation, and test system support for a new business computer, 5-10 years of applicable work experience, and a B.S. is required.

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Responsible for the first line supervision of business systems analysts and programmers, office automation specialists, and personal computer specialists. A B.S. in computer science with 10 years of applicable work experience, or MBA with 8 years experience is required.

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Provides planning, analysis and support in our data communications environment, makes hardware and software recommendations for our voice and data communication systems. 3-5 years of applicable work experience, and a B.S. in electrical engineering for computer science is required.

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Duties will include mathematical modeling and simulation, numerical analysis, and scientific programming in support of engineers working in the areas of structural analysis, fluid flow, and other technical fields. A PhD in a related field with emphasis in applied math is required, along with 3-5 years of applicable work experience.

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data processing

Programmer Analyst

(Information Systems)

SOUTHERN CALIFORNIA

National Medical Homecare is a rapidly-expanding subsidiary of National Medical Enterprises, Inc., and a leading distributor of respiratory and durable medical equipment. The expansion of our Corporate Information Systems group has created a challenging career opportunity that involves the implementation of a new on-line billing/operational and financial system.

Reporting to the Manager of Systems & Programming, this position assists in designing and documenting essential support systems for a large EMV-TF, TPPO, COROL 74 and 75S. Candidates must have a minimum of 5 years experience in on-line applications programming and thorough proficiency in COROL. Prior multi-user data base experience in financial and medical applications is desirable. Project leadership is a definite plus.

In addition to a highly-competitive salary and benefits program, we provide excellent opportunities for advancement in a stimulating professional environment. For consideration, submit a resume with salary requirements in confidence to: **Professional Staffing, Dept. 15, National Medical Homecare, 2300 West Orangewood, Orange, CA 92668.**

A Subsidiary of National Medical Enterprises, Inc.

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 Woodland Hills, CA 91367

DIRECTOR

Administrative Computing Services

Our Division is currently seeking an experienced individual to fill the position of Director of Administrative Computing Services. The position involves the planning and development of all administrative computing services.

The University seeks a highly qualified individual to provide leadership and oversight in the planning and development of all administrative computing services.

Qualifications include demonstrated management capabilities, technical competence and extensive related experience in all advanced topics, experience with IBM/AS/400 systems, and experience in administrative computing. A minimum of 10 years experience is required.

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To be given full consideration and resume and a list of three references prior to January 15, 1985 to Employment Office, One University Avenue, 0800 West 4th Street, North Hill, NY 10001.

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Senior EDP Auditor

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- Participate in development of annual EDP Audit Plan
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- Plan and accomplish or supervise accomplishment of assigned audit projects
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Should have professional certification and B.S. in Computer Science or business related field with minimum of three years EDP Audit experience in an MVS environment utilizing ACP2, TSO, RSCOE, CICS and IDMS.

Please mail resume and salary requirements to the Employee Relations Department. Principals only.



Central and South West Corporation

P.O. Box 22094 • Dallas, Texas 75222

Central and South West Corporation is one of the nation's leading electric utility companies, having annual revenues of more than \$2 billion. With corporate headquarters in Dallas, CWS serves more than four million people through its operating companies in Texas, Oklahoma, Arkansas and Louisiana.

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SYSTEMS PROGRAMMERS

Piscataway
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SYSTEMS ANALYST

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Interested candidates should send resume to:
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SENIOR PROGRAMMER/ANALYST

Minimum 4 years experience with System 360/59, RPO and SPS. Minimum 2 years experience with database coding and associated modules. Excellent opportunity for a person with ability to work directly with users and incorporate their requirements into final system specifications and implementation required. Competitive salary and fringe benefit program.

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SYSTEMS DEPARTMENT OF AMERICA
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Spartan, PA 15951

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PROGRAMMER ANALYST

The Henson ED Group, Inc., a subsidiary of T-Systems Corporation is currently seeking a Programmer Analyst with minimum of 2 years of experience using COBOL and FORTRAN to do analysis and programming of various types of systems. The successful candidate will be responsible for project planning, programming, testing, and documentation of programs and procedures with Visual Basic and dBase and familiarity with Visual Basic and dBase and management systems is a plus.

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Community Support 01

INTERNAL REVENUE SERVICE NATIONAL COMPUTER CENTER

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SYSTEMS PROGRAMMERS
GS-334-12 (\$30,548 to \$36,711)

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NCC is located in Wild, Wonderful West Virginia near the white water Shenandoah River, Blue Ridge Mountains, Historic Harpers Ferry, and the Appalachian Trail. Seven country living at nature's doorstep, yet within 1 1/2 hours of the urban, metropolitan areas of Washington, DC and Baltimore, MD. NCC is the nucleus of the twelve major IRS computer centers across the United States which support the U.S. tax administration system.

To apply, please send an SF-171, OPM Form 1170 and OPM Form 1205A for Personnel Office, Internal Revenue Service, National Computer Center, P.O. Box 1308, Marlinsburg, West Virginia 26401. Application materials may be obtained from any Job Information Center, with the Office of Personnel Management or any Federal Personnel Office. U.S. Citizenship is required.

CLOSING DATE: January 10, 1985
EOE

DATA PROCESSING

Joe A. Bank Clothiers, an expanding company and a subsidiary of the Quaker Oats Company, is looking for the following computer professionals to join our newly formed Data Processing Department. We are seeking a highly motivated, experienced, and versatile individual with a minimum of 5 years of experience in data processing, including, but not limited to, programming, systems analysis, and data management. The successful candidate will be responsible for the design, development, testing, and implementation of new software products and systems. He/she is a computer programmer, a computer systems analyst, and an experienced programmer.

SR PROGRAMMER ANALYST

Candidates must have 3-5 years experience in systems analysis, design, and implementation using the following software tools: COBOL, PL/I, CICS, and VSAM. The chosen candidate will work as part of a team of various project teams and be responsible for the design, development, testing, and implementation of new software products and systems. He/she is a computer programmer, a computer systems analyst, and an experienced programmer.

PROGRAMMER ANALYST

Candidates must have 2-4 years experience in systems analysis, design, and implementation using the following software tools: COBOL, PL/I, CICS, and VSAM. The chosen candidate will work as part of a team of various project teams and be responsible for the design, development, testing, and implementation of new software products and systems. He/she is a computer programmer, a computer systems analyst, and an experienced programmer.

PRINCIPALS ONLY, AGENCIES NEED NOT CALL

To be considered, send resume with salary requirements or contact personnel between 9 a.m. and 11 a.m.

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EOE

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